San Francisco, Citizens' Health Committee

ERADICATING PLAGUE

FROM

SAN FRANCISCO

Report of the Citizens' Health Committee

And An Account of Its Work

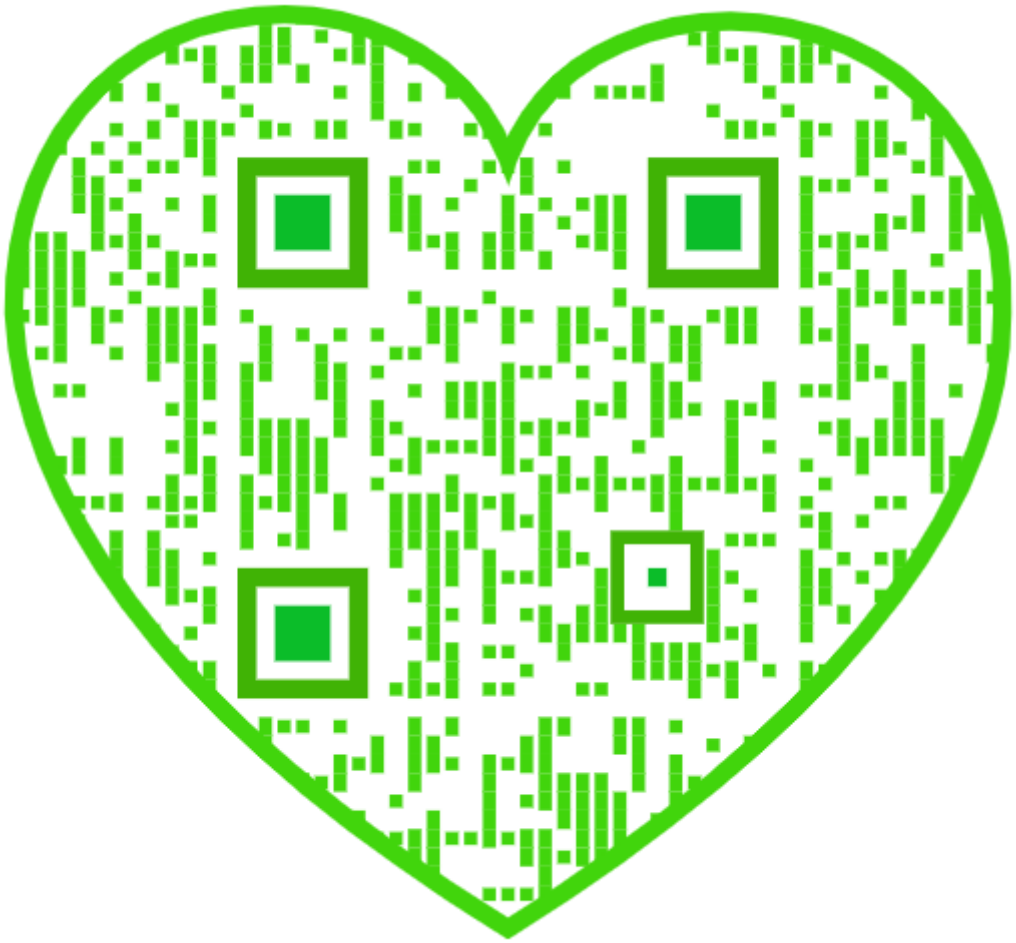
With brief descriptions of the measures taken, copies of ordinances in aid of sanitation, articles by sanitarians on the nature of plague and the best means of getting rid of it, facsimiles of circulars issued by the committee and a list of subscribers to the health fund.

March 31, 1909

PREPARED BY

FRANK MORTON TODD

Historian for the Committee



THE NEW SAN FRANCISCO

One of the Healthiest Cities in the World

The mortality from all contagious diseases for the year 1908 was less than two per thousand of population

Annex
WC
350
S119a
1911

PRESS OF
C.A.MURDOCK & CO.
SAN FRANCISCO

0021
1350

MAR 7 1950

SAN FRANCISCO BOARD OF HEALTH.

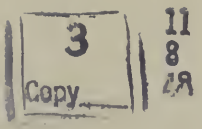
From September to December, 1907.

WILLIAM OPHULS, M. D., President
GUY E. MANNING, M. D.
T. G. McCONKEY, M. D.
F. DUDLEY TAIT, M. D.
T. W. HUNTINGTON, M. D.

For 1908.

WILLIAM OPHULS, M. D., President
T. W. HUNTINGTON, M. D.
GUY E. MANNING, M. D.
E. D. BULLARD
CURTIS HILLYER
JOHN P. McLAUGHLIN
WILLIAM F. WILSON

448295



CALIFORNIA STATE BOARD OF HEALTH.

MARTIN REGENSBURGER, M. D., (of San Francisco), President

WALLACE A. BRIGGS, M. D., (of Sacramento), Vice-President.

N. K. FOSTER, M. D., (of Oakland), Secretary

F. K. AINSWORTH, M. D., (of San Francisco)

A. C. HART, M. D., (of Sacramento)

O. STANSBURY, M. D., (of Chico)

W. LE MOYNE WILLS, M. D., (of Los Angeles)

THE FEDERAL SANITARY OFFICERS SERVING IN SAN FRANCISCO.

P. A. SURGEON RUPERT BLUE, Commanding; from September 7th, 1907, to the present time.

P. A. SURGEON W. COLBY RUCKER, Executive Officer; from September 12th, 1907, to the present time.

P. A. SURGEON C. W. VOGEL;

12th Provisional Plague District—from September 17th, 1907, to November 6th, 1907. 5th Provisional Plague District—from November 7th, 1907, to May 16th, 1908.

P. A. SURGEON R. H. CREEL;

1st Provisional Plague District—from September 17th, 1907, to January 7th, 1908. 6th Provisional Plague District—from January 8th, 1908, to November 1st, 1908.

P. A. SURGEON CARROLL FOX;

6th Provisional Plague District—from September 24th, 1907, to January 8th, 1908. Pathologist from January 9th to November 24th, 1908.

P. A. SURGEON G. W. McCOY;

Bacteriologist from March 16th, 1908, to present time.

ASSISTANT SURGEON J. R. HURLEY;

Staff duty General Headquarters from October 1st, 1907, to October 10th, 1907. 11th Provisional Plague District—from October 11th, 1907, to April 5th, 1908.

ACTING ASSISTANT SURGEON BRUCE FFOULKES;

5th Provisional Plague District—from September 23rd, 1907, to November 7th, 1907. 12th Provisional Plague District—from November 8th, 1907, to February 4th, 1909.

ACTING ASSISTANT SURGEON P. M. THOMAS;

2nd Provisional Plague District—from September 23rd, 1907, to February 4th, 1909. 5th Provisional Plague District—from May 16th, 1908, to February 4th, 1909.

ACTING ASSISTANT SURGEON L. S. SCHMITT;

4th Provisional Plague District—from September 23rd, 1907, to February 4th, 1909. 6th Provisional Plague District—from November 1st, 1908, to February 4th, 1909. 2nd Sanitary Division—from February 4th, 1909, to present time.

ACTING ASSISTANT SURGEON J. L. HOWARD;

9th Provisional Plague District—from September 23rd, 1907, to February 4th, 1909.

ACTING ASSISTANT SURGEON G. A. WEYER;

11th Provisional Plague District—from September 23rd, 1907, to October 11th, 1907. 8th Provisional Plague District—from April 27th, 1908, to July 15th, 1908. 7th and 8th Provisional Plague Districts—from July 16th, 1908, to August 7th, 1908. Sub-12th Provisional Plague District—from August 8th, 1908, to February 4th, 1909.

ACTING ASSISTANT SURGEON C. H. WOOLSEY;

3rd Provisional Plague District—from September 23rd, 1907, to October 31st, 1908.

ACTING ASSISTANT SURGEON G. M. CONVERSE;

Provisional Plague District Sub. 1—from October 19th, 1907, to February 4th, 1909. 1st Provisional Plague District—from January 8th, 1908, to February 4th, 1909. 3rd Provisional Plague District—from October 31st, 1908, to February 4th, 1909. First Sanitary Division—from February 4th, 1909, to present time.

ACTING ASSISTANT SURGEON H. H. HOPKINS;

Sub. 12th District—from November 1st, 1907, to July 20th, 1908.

MEDICAL INSPECTOR A. D. PRENTICE;

10th Provisional Plague District—from March 2nd, 1908, to October 31st, 1908.

MEDICAL INSPECTOR HERBERT GUNN;
8th Provisional Plague District—from March 20th, 1908, to April 27th, 1908. 11th District—from April 28th, 1908, to February 4th, 1909.

PASSED ASSISTANT SURGEON H. A. STANSFIELD;
Bacteriologist to March 14th, 1908.

ACTING ASSISTANT SURGEON JOHN N. FORCE;
May 6th, 1908, to October 31st, 1908.

GAVIN J. TELFER, M. D.
July 14th, 1908, to August 8th, 1908. (C. H. C. & Fed.)

ACTING ASSISTANT SURGEON MORTON R. GIBBONS;
August 17th, 1908, to February 4th, 1908.

ACTING ASSISTANT SURGEON HERMAN J. SCHLAGATER;
August 17th, 1908.

THE CITIZENS' HEALTH COMMITTEE OF SAN FRANCISCO.

GENERAL COMMITTEE.

HOMER S. KING, *Chairman*

L. M. KING, *Secretary*

E. H. RIXFORD
GUSTAVE BRENNER
T. C. FRIEDLANDER
H. H. SHERWOOD
FRANK J. SYMMES
CHARLES C. MOORE
HARRY M. SHERMAN, M. D.
MARTIN REGENSBURGER, M. D.
JOHN M. WILLIAMSON, M. D.
GEORGE H. EVANS, M. D.
CHARLES G. LEVISON, M. D.
JAMES H. PARKINSON, M. D.
R. H. SWAYNE
CAPT. H. W. GOODALL
JAMES MCNAB
A. W. SCOTT, JR.
L. M. KING
WALTER MACARTHUR
JOHN GALLWEY, M. D.
LANGLEY PORTER, M. D.
H. C. MOFFITT, M. D.
P. M. JONES, M. D.
F. DUDLEY TAIT, M. D., vice E. N. EWER, M. D., resigned
N. K. FOSTER, M. D.

EXECUTIVE COMMITTEE

CHARLES C. MOORE, *Chairman*

GUSTAVE BRENNER

WALTER MACARTHUR

GEO. H. EVANS, M. D.

A. W. SCOTT, JR., vice FRANK J. SYMMES, resigned

ERADICATING PLAGUE FROM SAN FRANCISCO.

TABLE OF CONTENTS

		Page.
Transmission of the Report		7
Chapter.		
I.	The San Francisco Epidemics	9
II.	The Plague	12
III.	B. Pestis	14
IV.	Ancient Epidemics	15
V.	The Rôle of the Rat	19
VI.	The Flea	24
VII.	The Present Pandemic	28
VIII.	The First San Francisco Outbreak	30
IX.	Favorable Soil	34
X.	The Return of the Pest	38
XI.	Mayor Taylor Appeals to Washington	39
XII.	Rat Cases Increase	40
XIII.	Waking up the Public	42
XIV.	The January Mass Meeting	45
XV.	The Citizens' Health Committee	49
XVI.	The People	52
XVII.	Presenting the Problem	55
XVIII.	Getting Down to Work	58
XIX.	Organization of the Citizens' Health Committee	59
XX.	Forming the Sub-Committees	72

Chapter.		Page.
XXI.	The Opening Guns	75
XXII.	A City of Meetings	81
XXIII.	Work in the Field	84
XXIV.	Financing the Campaign	85
XXV.	Work of the Sub-Committees	91
XXVI.	Organized Labor	99
XXVII.	The Clergy's Part	101
XXVIII.	The Japanese in San Francisco	104
XXIX.	Improvement Club Work	108
XXX.	Work of San Francisco's Women	110
XXXI.	The Public Schools	118
XXXII.	Main Points of Attack	122
XXXIII.	Garbage	123
XXXIV.	The Water Front	126
XXXV.	Butchertown	129
XXXVI.	Stables and Manure	131
XXXVII.	Warehouses	136
XXXVIII.	Markets, Restaurants and Hotels	138
XXXIX.	Chicken Yards	139
XL.	Domestic Rat Harbors	141
XLI.	Sewers; and the Rag Industry	144
XLII.	The Produce and Commission District	146
XLIII.	The First Six Weeks	151
XLIV.	Non-Political Appointments and the Total Graft	153
XLV.	House-to-House Inspections	155
XLVI.	Bounties, Traps and Poison	158
XLVII.	Some Minor Details of Committee Work	161

Chapter.		Page.
XLVIII.	Keeping the Public Temper Sweet	165
XLIX.	In Other Bay Cities	167
L.	Some Negative Results	170
LI.	City, State and Local Health Officials	172
LII.	Closing the Work	173
LIII.	Mutual Obligations	178
Approval of Accounts		180
Financial Statement		181
Certificate of Audit by Lester Herrick & Herrick		182
Some Statistics of the Campaign		183
Invitation to the Banquet		184
Appendix		185

LIST OF ILLUSTRATIONS.

Page.

The New San Francisco ..... Frontispiece
The Federal Sanitary Officers 11
One of the Regiments of Health 17
An Insulated Hospital 23
Getting Ready for a Day's Work 27
The Intelligence Department 33
Way for the Cat! 37
A Liquid-Ammunition Car 43
One of the Trapping Squads 47
Sterilizing a Building 53
The Only Good Rat is a Dead Rat 57
This Sort of Thing Had to Go 65
The Kind of Stable that was Condemned 73
What a Plague Spot is 79
Evicting Rodent Tenants 87
Real Cleaning up 95
Making a Plague-Proof City 103
Where Contagion Might Breed 111
If You Must Keep Chickens 119
Sanitary Requirements Satisfied 127
What the Basement Gave Up 135
The People at Work 143
Building Out the Plague 149
Clean Enough to Eat From 157
Why Fleas Are So Scarce 163
Enforcing Science and Health 169
The San Francisco Way 175

LETTER OF TRANSMISSION.

To his Honor, Edward Robeson Taylor, Mayor of San Francisco.

Dear Sir: Upon the eradication of bubonic plague from San Francisco, the Citizens' Health Committee ends its labors and makes to you its final report.

Its members were appointed by you on January 28, 1908, to secure the co-operation of the San Francisco public with the sanitary forces of the City, State and Federal governments then endeavoring to protect this city and the entire United States from impending pestilence. That San Francisco made a new record in sanitation, that the plague ceased and no trace of it can now be found on this peninsula, are sufficient evidence that, with the help of the public, the Committee discharged the obligation laid upon it; for without that concerted action of the whole people of San Francisco which this body was appointed to promote, no such fortunate outcome would have been possible.

The people of San Francisco have the satisfaction of knowing that they protected not merely their City, but the country at large. Had anti-plague measures failed here, the spread of the disease would have been extremely difficult to control. Therefore, the cities and states of the Union should, and we believe do, join with us in gratification at the happy outcome.

Bubonic plague did not originate here. It was imported in the train of foreign commerce. As our relations with other countries must continue increasingly, so will there be general risk of infection by plague or other Oriental diseases. While we devoutly hope no other American city will ever be called upon to do what was necessary here, yet the next point of attack may be some port on the Gulf or Atlantic Coast, and

it is in the hope that should such an unfortunate event occur our experience may be of benefit to some sister city that we have caused the following pages to be compiled.

This action is further prompted by the fact that at the outset of our campaign we had no precedents to direct us in securing intelligent popular co-operation; and while some of the Federal officers in charge of the work here were experienced in fighting plague in Oriental countries, none had encountered just this problem in an American community. It is the Committee's hope that in addition to informing laymen, this report may be of some direct assistance to medical men.

These are the reasons why we have recorded so extensively our experiences, our plans, and the measures we adopted. It is well for every American city to be prepared, for if ignorance and prejudice should prevent prompt and effective action when such action was necessary, the resultant loss of life and business would be without excuse.

THE CITIZENS' HEALTH COMMITTEE.

HOMER S. KING, *Chairman*

L. M. KING, *Secretary.*

E. H. RIXFORD
T. C. FRIEDLANDER
FRANK J. SYMMES
H. W. GOODALL
A. W. SCOTT, JR.
GUSTAVE BRENNER
H. H. SHERWOOD
R. H. SWAYNE
JAMES MCNAB
WALTER MACARTHUR
CHARLES C. MOORE
N. K. FOSTER, M. D.
JOHN GALLWEY, M. D.
JAMES H. PARKINSON, M. D.
CHARLES G. LEVISON, M. D.
LANGLEY PORTER, M. D.
PHILIP MILLS JONES, M. D.
HARRY M. SHERMAN, M. D.
JOHN M. WILLIAMSON, M. D.
GEORGE H. EVANS, M. D.
MARTIN REGENSBURGER, M. D.
H. C. MOFFITT, M. D.
F. DUDLEY TAIT, M. D.

SAN FRANCISCO, March 31, 1909.

ERADICATING PLAGUE FROM SAN FRANCISCO.

Chapter I.

The San Francisco Epidemics.

Bubonic plague reappeared in San Francisco in May, 1907. While the second outbreak may have resulted from reinfection, apparently it was a recrudescence of the Chinatown epidemic of 1900, which had been confined to about twenty blocks of the Oriental quarter, had claimed 121 victims, mostly Asiatics, of whom but eight recovered, and which by February, 1904, had been suppressed by the vigorous measures of the City, State and Federal health authorities under the direction, at first, of Dr. A. H. Glennan, Surgeon U. S. Public Health and Marine Hospital Service, now Assistant Surgeon-General, and afterward of his executive officer and successor in San Francisco, Passed Assistant Surgeon Rupert Blue.

In its second eruption the pest was not confined to Chinatown, but appeared at different times in practically all parts of the city, with the exception of the Richmond and Sunset districts. Very few Orientals were affected, almost all of the 160 human cases, of which 77 died, being white persons, many of them of a good condition of life, subsisting on generous diet and dwelling in houses that would commonly be called "sanitary."

The difference in mortality was probably due not so much to race or condition, but to early discovery and prompt treatment, while the causes of the change in the point of attack, from the Oriental to the white population, are now well understood and demonstrate the correctness of the defense measures adopted.

It was with the second outbreak that the work of the Citizens' Health Committee of twenty-five had to do. This work was essentially social in character, its purpose being to bring about a general co-operation of the people of the city with the sanitary authorities. Its most distinct aim was to organize the community for the starving and destroying of rats. It was an enterprise with no guiding precedents among white populations, and one in which the means of organization, of educating the public to a knowledge of its danger and its defense, and of promoting effective action, had to be improvised in the face of prejudice and a growing peril.

To-day there is no plague in San Francisco, and no plague-infected rats are to be found here. In closing its work the Citizens' Health Committee feels that its final report will be more serviceable if it contains, in addition to an account of the Committee's activities, some description of the conditions under which it labored, the nature of the city's requirements, and such information of a general character in regard to plague as would assist any community similarly threatened to proceed with the most effective measures of protection without the delay that the novelty of the problem necessitated here.

THE FEDERAL SANITARY OFFICERS

Passed Assistant Surgeon Rupert Blue and Staff. Standing in rear row: Weyer, Woolsey, Howard, Prentice. Standing in second row: Creel, Schmitt, Converse, Thomas, Hopkins. Seated: Vogel, Stansfield (bacteriologist), Blue (commanding), Fox (pathologist). Standing, front, on left, Ffoulkes; on right, Rucker.

CHAPTER II.

THE PLAGUE.

Before San Francisco could get rid of plague it had to go to school and study zoology, bacteriology, and fleas. The whole community had to learn about plague as a disease and an epidemic. In general, this is what it learned.

Bubonic plague is not a filth disease—it is a rat disease.

In the past, men often treated it as a filth disease, but without a shadow of success. It is true that filth aggravates an epidemic by giving food and shelter to rats and fleas, so that any intelligent sanitary measures must include the enforcement of rules of cleanliness. But cleanliness alone can not be relied upon, and the fact that some community may be cleanly in comparison with others is no guarantee that it is safe from plague. People that bathe every day are just as likely to get it as the perenially unwashed, if bitten by a flea that carries the specific bacillus of the pest.

The disease has three forms, corresponding to the three typical ways in which the microbe invades the body.

The commonest form, characterizing the early stages of an epidemic, is the bubonic, of which the plainest symptom is the swelling of the lymphatic glands nearest the point of inoculation into large, hard, and painful tumors called buboes. The mortality from this form is ordinarily as high as seventy-five per cent, although in the second San Francisco epidemic it was kept as low as sixteen, owing largely to the causes already stated, and partly no doubt to a somewhat higher resisting power that has been rather definitely manifested in some cases by well-fed people.

The pneumonic form follows an invasion through the respiratory tract, and the septicæmic follows the direct entry of the microbe into the blood. These two forms are almost invariably fatal.

The peculiar havoc of the pneumonic form arises from the fact that the sputum of the victim contains myriads of the germs, which, dried and blown about, may be inhaled by dozens of persons, thus affording an example of aerial transmission, with which it is most difficult to deal. The pneumonic form is ordinarily an advanced phase of an epidemic. The entry of the microbe into the blood sets up a swift putrescence and the victim literally rots to death in a few days.

During San Francisco's second visitation there were ninety-eight bubonic cases, of which eighty-three recovered; and there were four pneumonic and fifty-eight septicæmic, of which every one died, no matter how early the diagnosis or how prompt the help.

It may also be possible to communicate the disease through the digestive tract.

Hemorrhages under the skin, making dark purple blotches of stagnant blood, called "petechiæ," and "tokens," gave the disease the name of the "Black Death."

The possibility of transmission, in the septicæmic form, by mosquitoes, has been suggested, but not yet verified.

CHAPTER III.

B. PESTIS.

The plague bacillus was discovered by Yersin, of the Pasteur Institute, during the Hong Kong epidemic of 1894. It is a very perishable vegetable organism, depending for its life, for any considerable time, on a lodgment in living animal tissues and dying quickly in the sunlight or in dry, hot air, though it will live from thirty to sixty days in sterilized water at ordinary room temperature. It can not live indefinitely either in soil or water. There must be, for its natural propagation, a living host. Not even the excreta of rats will support it long, although any inhalation or ingestion of dried excreta before the bacillus in it dies would, of course, transmit the disease. Hence, food exposed to contamination by rats is especially dangerous, even though the animals may have but run over it.

The high mortality and devastating effects of bubonic plague have made it an object of general terror, and ignorance has ascribed its migrations and its visitations to supernatural causes, but when understood, the matter is not intricate, though the difficulties of coping with it may still be formidable. Accounts of its ravages in the past awaken a salutary dread today, and it will prove a bad hour for humanity should it ever lose that fear. For this reason it is well to consider some of the performances of the disease as it has affected mankind in the mass.

Chapter IV.

Ancient Epidemics.

Whether or not it is possible to identify it historically with the Biblical plagues of the pre-Christian era, there were thirty epidemics of the bubonic plague, as we know it, between the eleventh and fifteenth centuries. It made its worst recorded assault on the people of Europe in the fourteenth.

The population of Europe at that time was about 105,000,000. Starting from China in 1334, the "Black Death" killed 25,000,000 of these people, or nearly twenty-four per cent. Considering the effect to have been uniform, every fifth person in Europe, almost every fourth person, was doomed. If the rate was lower in some sections, it was higher in others. It is said to have killed half the population of Italy.

The visitation reached Florence in 1348, and Boccacio has left an account of it that shows most vividly its waste of life and wealth, its general devastation, and its demoralizing effect on both the urban and rural population of that time. His account says:

In the year then of our Lord 1348 there happened at Florence the finest city in all Italy, a most terrible plague, which, whether owing to the influence of the planets or that it was sent from God as a just punishment for our sins, had broken out some years before in the Levant; and after passing from place to place and making incredible havoc all the way, had now reached the West, where, spite of all the means that art and human foresight could suggest, as keeping the city clear from filth, and excluding all suspected persons; notwithstanding frequent consultations what else was to be done; nor omitting prayers to God in frequent processions; in the spring of the foregoing year it began to show itself in a sad and wonderful manner; and, differing from what it had been in the East, where bleeding from the nose is the fatal prog-

nostic, here there appeared certain tumors in the groin, or under the armpits, some as big as a small apple, others as an egg; and afterward purple spots in most parts of the body; in some cases large and but few in number, in others less and more numerous, both sorts the usual messengers of death. To the cure of this malady neither medical knowledge nor the power of drugs was of any effect. . . . Few or none escaped, but they generally died the third day from the first appearance of the symptoms. . . . Between March and July following it is supposed, and made pretty certain, that upwards of a hundred thousand souls perished in the city alone; whereas before that calamity it was not supposed to have contained so many inhabitants. What magnificent dwellings, what noble palaces, were then depopulated to the last person! What families extinct! What riches and vast possessions left, and no known heir to inherit!

It fared no better with the adjacent country; for to omit the different castles about us which presented the same view in miniature with the city, you might see the poor distressed laborers with their families . . . languishing on the highways, in the fields, and in their own houses, and dying rather like cattle than human creatures, and growing dissolute in their manners like the citizens, and careless of everything as supposing every day to be their last, their thoughts were not employed so much how to improve as to make use of their substance for their present support; whence it happened that the flocks, herds, etc., and the dogs themselves . . . would wander, no regard being had to them, among the forsaken harvest.

As the result of extended inquiry, Pope Clement VI estimated the total destruction of life throughout the world during this visitation at more than 42,000,000.

In Europe the disease became endemic and remained until the nineteenth century. In 1720 it traveled from Syria to Marseilles and killed 86,000 people. In 1770 it appeared in Moscow and killed 80,000. It appeared in the Balkan peninsula, in Greece, in Italy again. It broke out in Constantinople in 1803 and destroyed 150,000 lives, and again in 1815 and killed 110,000. Messina suffered a visitation in 1743.

In 1665 London was ravaged almost as Florence had been, and DeFoe wrote a celebrated account of it. DeFoe says

ONE OF THE REGIMENTS OF HEALTH

District Headquarters and storeroom, with the laboring force lined up in front. The sprinkling cans are for the purpose of distributing the antiseptic in places not easily accessible to the pump wagon and where infected rats have been found. The picks, rakes, axes, pitchforks and shovels are for the purpose of destroying the habitation of the rat. The brooms are used for sweeping up the rat-nests and other debris preparatory to their incineration. In headquarters are kept a card index of the sanitary survey of the district and all of the documents relating to condemnation and vacating proceedings. In the storehouse (the building on the left) all of the supplies and implements are neatly arranged and are issued only on memorandum order. Practically no non-expendable property was lost during the campaign.

they poisoned rats, but also that they tried to kill off all the cats and dogs, which were, of course, the only friends of man in the blind and hopeless contest he was making.

The great English diarists, Pepys and Evelyn, have left us accounts of this visitation, in which they speak of 10,000 dying in a week, the shops all closed, and grass growing in the streets.

Toward the end of the eighteenth century Egypt was recognized as an established plague focus. Between 1783 and 1844 twenty-one epidemics occurred. In 1799 plague wiped out 2,000 men of the French army in Egypt and Syria. As late as 1878 there was plague in Russia.

In the past plague has appeared to wander over the globe in the most erratic way, breaking out where least expected. Today, its mode of conveyance being understood, its migrations appear perfectly logical, and one can almost foresee where it will next appear. It travels in ships. Its invasions are, as a rule, from the sea. In the present migration it is knocking insistently at all the great seaports. Sydney has heard it. So have Glasgow, Marseilles, and Oporto. It has tried to force an entrance at London. It has crossed the Atlantic and attacked Argentine, Paraguay, and Brazil. La Guayra it has had by the throat. And it advances stealthily by the islands of the Spanish Main toward the Atlantic and Gulf coasts of the United States.*

* Most of the facts in this chapter are taken from Dr. Colby Rucker's translation of the fourth chapter of La Pathologie Exotique, by Prof. A. Le Dantec, of the Faculty of Medicine, Bordeaux, published in the *California State Journal of Medicine.*

Chapter V.

The Rôle of the Rat.

The first lesson to be learned, then, was that the plague is a disease of rats (including mice) and squirrels, transmitted to man through the medium of the flea. The Citizens' Health Committee has dinned it into the public ear in San Francisco in every way, shape, and manner for a year, until it should be as generally understood as the alphabet.

People that suppose rats are in some way necessary to humanity are mistaken. There was no aboriginal or autochthonous European rat. The rat invaded Europe in two great migrations: first, the black rat, before the fall of the Roman Empire, and then the brown rat early in the eighteenth century. The rat breeds the year around and is extremely prolific. In a modern plague campaign there must be rat destruction, not only that the numbers may be kept down, but in order that there may be continuous bacteriological observation of the bodies, so that efforts at extermination may be concentrated at infected points until the diseased animals have all been destroyed and the foci of the plague are clean.

Truth is seldom new. If there were no references to the rat in old accounts of plague, the rat theory might naturally be looked on with some suspicion by the unscientific mind. From the earliest times, however, people have noticed that plague was apt to accompany sickness among rats, and with that knowledge they might have defended themselves intelligently, and sometimes did make feeble efforts at it. But the rat theory lacked scientific support, and was so overlaid and mixed up with notions about original sin, the wrath of God, comets, blazing stars, flaming swords in the sky, juxtaposi-

tion of planets, and other mediæval mental garbage, that the suggestions of sensible sanitarians would not have been welcomed much more readily than they were later among some of the San Franciscans.

An article in the Encyclopædia Britannica, printed as recently as 1890, after discussing various possible ways by which plague might be transmitted, says this about rats:

> A very remarkable circumstance is the death of animals (rats and, more rarely, snakes) which occurs at the outbreak of an epidemic. The rats bring up blood, and the body of one examined by Dr. Francis showed an affection of the lungs.

Probably we have no adequate conception of the extent to which the lower animals are infested with parasites. The whale's belly is covered with barnacles, the back of the elephant, in a state of nature, with fungus, and of the thousands of rats examined in San Francisco, black, brown, red, and gray, thirty-four per cent were found to contain tapeworm, and almost all of them had something of the kind—trichinosis, flukes, round-worm, thread-worm, or some other sort of undesirable citizen, whose eggs, excreted and carried on the feet and legs of their hosts to human food, could easily (and doubtless, often did) start colonies in human insides.

And all of them have fleas, in season, until they are dead, when these parasites leave their cold bodies for warm ones, or take refuge in floor cracks or house dirt. A sick rat, being indisposed to clean himself, has more fleas than a well one; and the fleas do not seem to love him less because his indisposition arises from bubonic plague.

Plague may be chronic in a rat; that is, "the lesions are in circumscribed abscesses and the animals are not emaciated or sickly." Such an animal would be a perambulating magazine, carrying the disease across wide reaches of territory and causing apprently unconnected outbreaks hundreds of miles apart, or separated by long intervals of time.

The rat has several long Latin names, but he carries plague equally well under any of them. It is useless to extend special privileges to any particular species of rat.

Cessation of plague in the past may have been due to immunization of individual rats that had suffered from it and recovered or of the rat tribe through the survival and propagation only of resistant individuals, or to weakening of the virulence of the bacilli, or both causes. And fresh outbreaks may have been due to reinfection, brought by new rat migrations from established foci.

One San Francisco example will illuminate the subject of the relation between the rat and plague in man. A thrifty German family, consisting of a man and wife, three children, and a grandmother, apparently well housed and domestically neat and clean, was wiped out by plague, with the single exception of an eighteen-months-old boy. There was no known focus of infection near them, but when the wooden flooring of the house and back yard were torn up, the carcasses of nineteen plague-infected rats were found.

In the Chinatown epidemic eighty-seven dead rats, eleven dead of plague, were found in the walls of a Chinese restaurant. Several cases of human plague had been traced to this place, but they immediately ceased when the rats were cleaned out.

When very hungry, rats often turn cannibal. At such times, invalids would become the convenient prey of the strong, who would thus ingest the plague in numbers.

Male rats eat their young, but not enough.

The natural enemy of the rat is the homeless and hungry cat—not the sleek and pampered cup-winning house pet, with a ribbon and bell, but the mean and scrawny brute that yowls at night and can't be petted and has to get its living where it can.

The offices of such felines in harrying rats away from food, in breaking up rat families and disturbing their breeding places and preventing over-ground migrations, is probably valuable beyond estimate. In the great London epidemic they tried to kill off all the cats, and the plague blazed out like a conflagration in a high wind.

It is thought that cat fleas will not carry plague, but this point has not been fully settled.

Dogs are good harriers of rats, but they also interfere with the operations of the cats, which are probably more effective.

Human agencies do not seem to play directly any great rôle in spreading plague. Neither do freights, except as a vehicle for infected rats and fleas. Conditions commonly considered insanitary only contribute to the danger of plague because they afford shelter and food to rats.

AN INSULATED HOSPITAL

Isolation Camp, in which the victims of bubonic plague were treated with the latest methods known to science. Over fifty per cent were saved—an unprecedented record.

CHAPTER VI.

THE FLEA.

Five thousand bacilli of bubonic plague could harbor in the gizzard of a single flea, and the flea feel just as athletic and enterprising as any other insect.

Triturated fleas from a plague rat have been injected into a healthy mouse, and the mouse has straightway sickened and died of plague. (No infected mice have been found in San Francisco, but mice are subject to the disease as much as rats.)

Were there no fleas or other suctorial parasitic insects, there would be no bridge for the plague from rat to man, or from man to man, or from man to rat and back to man again, or even from rat to rat.

In winter, when fleas are scarce, plague is relatively quiescent among human beings, though apt to be spreading among the rats, who huddle in their burrows more closely in cold weather and probably devour the sick among them, rather than go abroad for food. At such times the disease may disappear entirely from among men, but be "stored in the rats." An examination of trapped rats may show no more than one flea to six of them. They combed twenty rats in the Federal laboratory in San Francisco last winter without finding a flea on them. But in flea time, in spring, when they breed actively, and in summer, a healthy rat will support twenty-five or thirty fleas, and a sick one as many as eighty-five. The bacilli multiply in the flea's stomach and the flea seems none the worse.

Nature could hardly have produced a more effective instrument for inoculating people with plague than the flea. If he

misses with his bite, he has another resource, for as he bites he exudes blood. The bite itches. The victim scratches, and the chances are high in favor of his rubbing the infected blood into the fresh puncture in the skin. Some say the microbe is virulent enough to penetrate the skin alone.

In India the rat catchers of the sanitary service died at a frightful rate until the case against the flea was established. Now they destroy the fleas by dipping the rats into bichloride of mercury solution, and their mortality is no higher than that of any other class.

To carry the infection even from rat to rat with any certainty the flea is required.

These statements are not guesses. They are facts that have been demonstrated by actual experiment with rats and fleas—well rats, sick rats, rats with fleas, and rats without, sick and well rats in the same cage with and without fleas, on the floor and suspended above it out of flea range; well rats made sick by fleas from sick rats, and well rats kept well while living with plague rats in flea-proof cages. The facts have been demonstrated just as the mosquito's part in malaria transmission has been demonstrated.

Even young rats suckled by plague-infected mothers have not taken the disease when no fleas were present to convey it.

Rat fleas bite men. They usually prefer to bite rats, but when the sick rat is dead and his eighty or eighty-five boarders have left his cold cadaver and camped for a few days without food, in a crack in the floor, or under the mould-board, or in a little pinch of dust in a corner that the broom failed to reach, they will bite anything. They will bite a white man just as quick as a Chinaman, or a Hindu, if they can reach him.

All the rat family, including the mouse, seem susceptible to plague, but not all the fleas appear equally qualified to

carry it. The experiments of the Indian Plague Commission have been made with the following species of flea:

1. Pulex Irritans, the human flea;
2. Pulex Cheopis, the rat flea;
3. Pulex Felis, the cat flea;
4. Pulex Ceratophyllus Fasciatus, the rat flea of North Europe.

Of thirty-eight experiments at transmission by the human flea only three were successful; of twenty-seven with the cat flea none succeeded; but both varieties of the rat flea were found to be generally effective plague carriers. It is Pulex Ceratophyllus Fasciatus, or the North European rat flea, that most abounds on the rats in San Francisco.

Fleas shun the sunlight and the air. They deposit their eggs in rat-nests, and the rats hatch them out with the warmth of their bodies and then give the young fleas free transportation wherever they go. Sulphur fumes will kill them, so that fumigation with burning sulphur has been found effective.

GETTING READY FOR A DAY'S WORK

Preparing the dainty poison croutons for the destruction of the wily rodent. This poison was distributed with great care by men specially chosen and trained for the purpose. It is remarkable that in spite of the fact that millions of pieces of poison were distributed not one single case of human poisoning occurred. Note the foreman with the badge standing at the end of the table directing the work. The poison was spread on stale bread, and was usually composed of phosphorus or arsenic mixed with lard, cheese, sugar and other food preferred by rats.

CHAPTER VII.

THE PRESENT PANDEMIC

Yunnan province, in China, appears to be, or contain, a permanent storehouse of plague material. In 1894 the pest attacked Canton, which is connected by river with the Yunnan country, and killed 180,000 people. Getting across to Hong Kong, it killed 12,000 Chinese there.

In 1896 it reached Bombay and is there still. It has spread all over India, and in the face of modern medical skill has claimed over five and a quarter million victims, being fatal in over 90½ per cent of the cases. In 1904, the year the first epidemic was suppressed in San Francisco, it killed over a million people in the Indian Empire, destroying in a single week over 76,000 lives—a number equal to the British army in India.

After its appearance at Bombay it traveled to Australia and New Caledonia, to Hawaii and Japan. It reached Portugal, Italy, Austria, and England. Early warnings and sharp repressive measures kept it down. It was traced directly to Marseilles in a lot of rags from Bombay consigned to a pasteboard factory. It claimed a victim at Vienna and one at Berlin, the disease having been contracted in the course of laboratory work. It has touched fifty-two different countries in the course of its present wanderings and no continent is now clean of it.

The countries it has attacked are said by Assistant Surgeon-General J. M. Eager to be the following: Arabia, Asiatic Russia, Asiatic Turkey, China, Chinese Turkestan, French Indo-China, India, Japan, Persia, Persian Turkestan, Siam,

Straits Settlements, Algeria, British East Africa, British South Africa, Egypt, French Ivory Coast, German East Africa, Liberia, Madagascar, Portuguese East Africa, Reunion, Tunis, Zanzibar, Australia, Hawaii, New Caledonia, New Zealand, Philippines, Sumatra, Austria, France, Germany, England, Scotland, Italy, Portugal, Russia, Turkey, Argentina, Brazil, Chile, Mexico, Panama, Paraguay, Peru, Trinidad, United States, Uruguay. And, according to the same authority, there have been since 1894, 243 cases, of which 122 were fatal, on 139 vessels sailing in various parts of the world.

In March, 1900, it appeared in Chinatown, San Francisco.

A bacteriologist at Ann Arbor, Michigan, caught it through a laboratory accident while working with cultures of the germs taken from this City in that year.

CHAPTER VIII.

THE FIRST SAN FRANCISCO OUTBREAK.

In San Francisco plague met politics. Instead of being confronted by a united authority with intelligent plans for defense, it found divided forces among which the question of its presence became the subject of factional dispute. There was open popular hostility to the work of the sanitarians, and war among the City, State, and Federal health authorities.

A Federal health officer was arrested for trying to do his duty as he saw it. Eugene Schmitz, while mayor, refused to approve the printing of health reports and vital statistics and attempted to remove from office four members of the Board of Health who persisted in the statement that plague existed in the City. The State bacteriologist, Ryfkogel, found plague germs and lost his position and part of his back salary.

The public drew its inferences from the voluminous misinformation furnished by the disputants. Plague was said to be a mediæval disease. It belonged to the days of Charlemagne or James II before the common people had soap. It was an Oriental disease, peculiar to rice-eaters. It was a Mongolian or Hindu disease, and never attacked whites. In San Francisco it was not a disease at all—it was graft. Landlords of Chinatown rat warrens contended fiercely that their premises were perfectly sanitary because the plumbing was vented.

For a while the people were in the gravest danger and it seemed impossible to convey any adequate warnings to them. Intimations from medical conventions of Eastern State boards of health that unless San Franciscans got together and stamped out the plague, it would be necessary to enforce a

general quarantine against the City, actually brought forth a demand from certain quarters that the Marine Hospital fellows go back to Washington where they belonged.

Yet in spite of such difficulties the Federal health authorities under Drs. Glennan and Blue managed to confine the disease to some twenty blocks of the Chinese quarter.

In time, and none too soon, a "Mercantile Joint Committee" was formed on the floor of the Chamber of Commerce, at the call of President Frank J. Symmes of the Merchants' Association, which demanded that the City, State, and Federal health officers unite to satisfy the requirements of the sanitarians. Under the leadership of Mr. Symmes, the members of the committee called on Mayor Schmitz and impressed upon him the necessity of using his influence with his Board of Health (it had changed in the meantime) to secure its co-operation with the Federal and State authorities. Whatever may have been the attitude of individuals, the general charge that "the business interests" of San Francisco sought to suppress plague information for business purposes is untrue. On the contrary, the Mercantile Joint Committee insisted that the facts be made public; and they were made public in the "Merchants' Association Review."

With this sort of support, Dr. Blue, who had succeeded Dr. Glennan, broke up the first epidemic of plague in San Francisco.

In general, his method was to destroy all the rats possible and insulate human beings from the rest by putting concrete foundations under houses and concrete floors in back areas, light shafts, basements, and similar places.

There were about 625 separate parcels of "improved" real estate in Chinatown, of which only about sixteen were owned by Chinese. In the twenty blocks was an Oriental population of about 14,000. After eighteen months of unremitting toil,

of trapping and poisoning rats and destroying their harboring places, of tearing the sodden planking out of light wells that were prehistoric Chinese garbage dumps, of letting the sun into noisome old cellars that had not seen the light for forty years, of inducing, persuading, and compelling landlords, and their agents, and trustees for minors traveling in Europe, to pave back areas and basements and fill the spaces in the underpinning of tumble-down shacks with concrete, and tear down and rebuild where the problem was hopeless of solution any other way,—after eighteen months of this sort of campaigning, the last vestige of the disease disappeared and Dr. Blue left San Francisco.

The plague had been "built out." The fear of quarantine was a thing of the past. When these specters returned it was in a new form, under strange conditions, to menace a people stripped of their natural defenses and left naked to the enemy by circumstances then unparalleled.

THE INTELLIGENCE DEPARTMENT

Inspector of the United States Public Health and Marine Hospital Service interviewing a householder. He is making a note of the street, the number of the residence, number of persons living therein and other facts relating to the sanitary history of the premises. After gaining this information he will visit every room in the house, making a record of its condition. All premises in the thirty square miles of San Francisco's territory were visited in this way many times, and careful account kept of their sanitary condition.

CHAPTER IX.

FAVORABLE SOIL.

It was not so much the magnitude of San Francisco's calamity as the character of its results that invited pestilence and seemed to make it feel at home. If, in gazing over the terra-cotta field of the fire anyone thought of the late epidemic, it was to say with some relief, "Well, we've got rid of that, anyway. This is certainly the Sterilized City."

Reconstruction commenced. Chinatown began to rebuild, as well as the rest of the burned area. Except there, temporary wooden shacks began to arise in numbers, many of them built over cellars full of debris.

Digging and pumping out basements for the permanent structures of steel and stone and concrete began. By August, 1907, rebuilding was under way in every part, almost in every block, of the burned district. With a rush came the knowledge that the plague was all over the City—except in Chinatown; that it was attacking clean, well-fed white people in good houses and killing them with despatch.

That is, such knowledge came to those willing to receive it. One of the peculiar characteristics of plague epidemics, so peculiar that it ought to be useful in diagnosis, is the readiness with which a community will believe some other community has it, and the distrust it has for any evidence of its own infection. The early announcements were received with exasperation. "Now," said the doubters, "we know we never had it. Fire the Board of Health and the plague will disappear again."

There seems to be no phase of the plague problem, bacterial, zoölogieal, social, economic, industrial, or political, that San Franeisco has not been compelled to wrestle with, exeept possibly the Hindu's pious affection for the rat. That is why an aceount of the San Franeisco eampaign is likely to be useful to any other city the disease attacks.

The ground-shoek had broken the sewers, many of which had never been very good, in hundreds of places. The fire had left the open stump of a soil pipe on nearly every burned-over lot. The rats could go in and out of the branches where they pleased and nse the main lines for boulevards.

The lots were littered with sheets of old roofing tin, sheet-metal cornices, and similar debris, and many that were cleared were piled with cleaned brick,—all of which made good homes for rats.

Thousands of homeless people had to be temporarily housed in "wooden tents" and other flimsy shelters, in large camps, where the sanitary equipment and scavenger service were of necessity rudimentary. No experience had at that time shown the best way to keep these camps clear of plague, and nobody expeeted plague anyhow.

Thousands of laborers of various nationalities and habits had eome into the City and were employed clearing streets and building-sites, cleaning briek, excavating cellars, mixing concrete, rebuilding the street railway system, and working on the temporary steam roads that helped haul the debris out of the burned district. A large proportion of these men lived in rough temporary bunk houses. In a City where food has always been abundant, the lunches they took to their work were probably more generous than appetizing, and the streets, the vacant lots, and the buildings themselves were the only garbage reeeptacles "down town." The rats would take care of the leavings—that was what rats were for. Nobody had

any objections. God made them for scavengers, so let them scavenge. Travelers through the burned district at night could see hundreds of them scampering across lots and around the places where workingmen assembled to eat their lunches.

Always excepting Chinatown, from which the plague had been "built out," and which rebuilt, perforce, on rat-proof lines, the burned district became a rat paradise. When the rat population became uncomfortably congested in the rebuilding area, the more enterprising could emigrate up the sewers to the refugee camps, the temporary business districts, and the unburned residence neighborhoods. The City presented these openings to the enemy in addition to its normal accumulations of rubbish, its customary carelessness with its garbage, and the easy human toleration of the rat that has prevailed among fairly intelligent people for centuries.

WAY FOR THE CAT!

Rat-proofing by elevation. The refugee camp here shown, in spite of the fact that it was maintained in a cleanly condition, furnished cases of human bubonic plague almost daily in late September and early October, 1907. Every expedient known was used to get rid of the disease but without avail, until Dr. Blue evolved the theory that if the houses were elevated so as to allow free access to the cat and the dog, the disease would cease. This was done and immediately the disease was controlled. Note the buildings elevated eighteen inches to two feet above the ground. Later the sidewalks were elevated. Note the garbage can with a tight-fitting cover over the *outside*. Note that the platform on which the can stands is elevated above the surface soil.

CHAPTER X.

THE RETURN OF THE PEST.

In May, 1907, a sick man, in a stupor, was taken to the United States Marine Hospital from a tug in the bay. The doctors that attended him had served in the Orient and recognized his case as plague, but he died without rousing enough to tell them where he had been.

They thought they would find out from the other hands on the tug, but she had left port. The next they heard of her was that she had been lost off the Mendocino County Coast. Plague had come back to San Francisco, but nobody knew where to look for it.

For two months and a half it hid. On August 12 another case occurred, and before the month was over fourteen people had been attacked and the cases were scattered, practically speaking, all over the City. There was no single focus. There was no restricted area that could be roped off and quarantined from the rest of the City. Plague was no longer a typically Oriental disease, nor wholly a filth disease, nor the peculiar affliction of vegetarians. Yet it was curious how hard these ideas were to dispel, even in the face of the evidence furnished by white men's funerals.

Chapter XI.

Mayor Taylor Appeals to Washington.

In September, 1907, there were fifty-five cases of plague in San Francisco, and a new and better City administration, realizing that the increase of the disease had become a matter of national concern, called on the President of the United States for help. President Roosevelt directed Surgeon-General Walter Wyman, of the United States Public Health and Marine Hospital Service, to take charge of the situation. Dr. Wyman ordered Passed Assistant Surgeon Rupert Blue to assume command locally, and with him sent Passed Assistant Surgeon Colby Rucker as executive officer. Passed Assistant Surgeon Stansfield was on the ground. Passed Assistant Surgeons Creel, Vogel, and Fox, and Assistant Surgeon Hurley, who were in Alaska, were ordered to join at San Francisco; Passed Assistant Surgeon Woolsey was ordered from the East; and the brigade was filled out by the addition of Acting Assistant Surgeons Schmitt, Converse, Weyer, Howard, Ffoulkes, Prentice, Hopkins, and Thomas.

Headquarters were established on Fillmore Street, a laboratory was installed, the City was divided into thirteen Federal Sanitary Districts, each with an office in the field, a surgeon in charge, and a corps of inspectors, assistant inspectors, foremen, and laborers. One item will indicate the sort of efficiency aimed at and achieved by Dr. Blue and his staff. Some 154,000 rats have been bacteriologically examined in this campaign Laboratory assistants developed a skill that enabled them to open and prepare for examination five hundred rats per day per man.

CHAPTER XII.

RAT CASES INCREASE.

Blue's brigade began operations in mid-September. In what was left of the month they found four infected rats. The human plague began to decline immediately, probably because the number of the fleas was diminishing with cooler weather; but the rat infection increased, and the monthly records of human cases and infected rats found run side by side in the following order:

	HUMAN CASES.	INFECTED RATS.
1907		
October	34	23
November	40	37
December	10	43
1908		
January	4	64
February	1	89
March	0	62
April	0	36
May	0	20
June	0	3
July	0	1
August	0	1
September	0	0
October	0	2
November	0	0
December	0	0

The last human case of plague in San Francisco sickened on January 30, 1908, and is credited statistically to February

because discovered in that month. As the two infected rats taken in October were both caught in the same building within two days and no more can be caught in that vicinity or any other in San Francisco, it may safely be assumed that the last focus of infection has been cleaned out.

In view of the facts that Dr. Blue arrived in September, 1907, and the Citizens Health Committee was appointed late in January, 1908, these two rows of figures are full of interest. They show the accuracy and value of the work performed. Beginning in October, after Dr. Blue's arrival, the human cases diminished, and did not increase again even with the return of summer weather. Beginning in February, after the Committee and the people began their labors, the number of infected rats grew steadily less.

CHAPTER XIII.

WAKING UP THE PUBLIC.

In Manila, when the number of infected rats reached one per cent of those examined, there were over sixty human cases a month. Experience has shown that a rat infection of two per cent usually means a terrible outbreak of human plague, with the chances good that it will run into the pneumonic form and spread death through a helpless and panic-stricken community. Whether such a result would have followed in San Francisco or not is, owing to the use of better houses than those commonly found in Oriental countries and the more general insulation of human beings from rats, problematic. Dr. Blue did not wait to see. When, in spite of all he and his men and the City and State health authorities could do, the rat infection began to climb toward one and one-half per cent, he became convinced that the public must be aroused and that the people, the whole people, must go to fighting rats instead of the Board of Health.

Early in January, 1908, Dr. George H. Evans, President of the California State Medical Society, sent out, at Dr. Blue's suggestion, 600 invitations to leading citizens, including business and professional men, asking them to meet and consider the situation. Exactly sixty appeared.

But if the meeting was disappointing in numbers, the few earnest physicians and laymen present that appreciated the gravity of the situation, sowed the seed of ultimate success. A resolution was adopted calling on Mayor Taylor to appoint a committee of twenty-five citizens to secure public co-operation with the health authorities. This resolution received

A LIQUID-AMMUNITION CAR

Pump wagon spraying a cheap lodging-house in Chinatown with disinfectant for the purpose of killing fleas and other parasites (sofa bugs, for example). In addition to this, places furnishing cases of human or rodent plague were sealed with strips of paper and carefully fumigated with sulphur in the proportion of two pounds to 1,000 cubic feet of initial air space.

the active attention of the officers of the commercial organizations, who issued a call to their members and the general public for a mass meeting on the floor of the Merchants' Exchange on January 28. Thus was launched the popular movement.

Chapter XIV.

The January Mass Meeting.

In the absence of President C. S. Laumeister of the Merchants' Exchange, G. X. Wendling, the vice-president, presided, and L. M. King, secretary of the Merchants' Association, was called upon to act as secretary.

In the meantime a realization of the real nature of the trouble had been gaining ground. There was a large attendance. Those present that were informed on the subject knew that while the human epidemic had been checked, the dry season, when fleas abound, would begin with a larger percentage of infected rats than the previous one had, unless something pretty vigorous was done about it. To those without such information, Dr. Blue presented the facts. He told of the work already done, but stated that the rat plague had risen to almost one and one-half per cent of those examined, and that in view of the wide distribution of this infection, the difficulties were becoming greater than the Health Department could cope with. It had become necessary for householders to co-operate with the health authorities, clean up their premises, shut off the rats' food supply by keeping all garbage in tight-covered metal cans, and make rats homeless by destroying their nesting places.

The meeting was addressed by Dr. Regensburger of the State Board of Health and by Governor Gillett, who urged the gravity of the matter and the need of public co-operation with the authorities. The governor was followed by Dr. William Ophuls, president of the San Francisco Board of Health, by Dr. Hobdy, in charge of the United States Quarantine

Station, who spoke on the necessity for immediate action to prevent a general quarantine of San Francisco, and by Mayor Taylor, who announced the names of the Citizens' Health Committee appointed to assist the health authorities and secure the co-operation of the public.

T. C. Friedlander, secretary of the Merchants' Exchange, introduced the following resolutions, which were unanimously adopted by a rising vote:

WHEREAS, The throwing of garbage upon vacant lots, or the keeping or collecting of garbage in any manner contrary to the ordinances or health regulations of the City is a menace to the public health and safety; and

WHEREAS, Such practices must be stopped; therefore, be it

Resolved, That the Judges of the Police Courts of San Francisco are hereby requested to *strictly enforce* the health laws and ordinances of the City and County, and to punish by fine or imprisonment all persons when arrested for committing offenses contrary thereto, when it is shown, beyond a reasonable doubt, that such persons are guilty.

Resolved, That the attention of the District Attorney be called to the necessity for a strict enforcement of the health laws of the City and County of San Francisco.

Resolved, That all citizens be called upon to admit to their premises any duly authorized inspector or employee of the United States Public Health and Marine Hospital Service, or of the City Board of Health, upon the presentation of the official badge or proper authority from said departments, for the purpose of inspecting said premises for rat holes, improper disposal of garbage or for the placing of traps or poisons for the destruction of rats, such inspection being necessary for the preservation of the public health and the eradication of rats infected with bubonic plague.

Resolved, That to give full effect to the foregoing resolutions, all inhabitants of the City and County of San Francisco, men, women, and children, be and they are hereby called upon to assist in every way to improve the sanitary conditions of the City.

Resolved, That the Board of Supervisors be and they are hereby requested to provide immediately all necessary regulations for the col-

ONE OF THE TRAPPING SQUADS

Bringing in the morning's catch. Note the cage trap, the man attaching the rat tag showing where, when, and by whom the rodent was captured, and the sex and species of the animal. Note the man in the center dipping the trap in the tub of antiseptic solution for the purpose of killing both the rat and his parasites.

lection and disposal of garbage, the extermination of rats, and any and all precautionary measures necessary for improving the sanitary condition of the City.

Resolved, That the Chief of Police be and he is hereby requested to require every police officer to fulfill his duty as a Health Officer as required by Section 3, Chapter 6, Article VIII, of the Charter, and to prevent the throwing of garbage or other refuse on streets or upon vacant lots, to arrest all persons found so doing, and to enforce strictly the ordinances of the City and the regulations of the Board of Health in all sanitary matters.

Resolved, That the attention of the press of San Francisco is called to the resolutions adopted at this meeting, and they are hereby requested to publish from time to time, for the information of the public, correct notices of the sanitary condition of the City, as furnished by the Federal and City Health departments, together with the number of cases of bubonic plague, if any, occurring from month to month, and the localities where infected rats are found. The press is further particularly requested to urge upon the public, by occasional editorials and notices, the duty of all citizens to co-operate with the health authorities by keeping their garbage in covered metal receptacles, by destroying all rats upon their own premises and by preventing the throwing of garbage or any other food for rats in back yards or upon vacant lots adjacent to their premises.

Chapter XV.

The Citizens' Health Committee.

These are the members of the Citizens' Health Committee, as appointed by Mayor Taylor:

Homer S. King, President San Francisco Clearing House Association.

Charles C. Moore, President Chamber of Commerce of San Francisco.

Frank J. Symmes, President Merchants' Association of San Francisco.

A. W. Scott, Jr., President Civic League.

T. C. Friedlander, Secretary Merchants' Exchange.

L. M. King, Secretary Merchants' Association of San Francisco.

H. W. Goodall, Shipowners' Association.

E. H. Rixford, San Francisco Bar Association.

Gustave Brenner, San Francisco Credit Men's Association.

H. H. Sherwood, San Francisco Board of Trade.

R. H. Swayne, Shipowners' Association.

James McNab, Draymen's Association.

Walter Macarthur, Organized Labor.

Martin Regensburger, M. D., President State Board of Health.

N. K. Foster, M. D., Secretary State Board of Health.

James H. Parkinson, M. D., California State Board of Health.

John M. Williamson, M. D., ex-President San Francisco Board of Health.

ARMY MEDICAL LIBRARY WASHINGTON, D. C., U. S. A.

Geo. H. Evans, M. D., President California State Medical Society.

Philip Mills Jones, M. D., Editor *California State Journal of Medicine.*

John Gallwey, M. D.

Chas. G. Levison, M. D.

Langley Porter, M. D.

Harry M. Sherman, M. D.

H. C. Moffitt, M. D.

E. N. Ewer, M. D., Health Officer, Oakland, Cal.

Later, Dr. F. Dudley Tait of San Francisco was substituted for Dr. Ewer, who found his official duties across the bay too heavy and resigned.

Beginning January 30, 1908, the Citizens' Health Committee held nine meetings of the general body and sixty-six by its Executive Committee. Many special meetings were held, in addition, with representatives of the various industries and trade and commercial organizations. The Committee caused hundreds of meetings to be held, of business men, mothers' clubs, school children, women's clubs, employees of industrial plants and commercial houses, improvement clubs, social settlements, and representatives of all important lines of trade and industry in the City.

It collected $177,512.38 and disbursed $139,943.65.

It kept four hundred paid inspectors and laborers in the field for several months, trapping and poisoning rats, in addition to the force maintained by the Board of Health and the Federal government,—paid these men and equipped them, and put at work a large force of volunteer inspectors besides.

It purchased nearly $15,000 worth of rat traps and poisons, buying cheese for bait in lots of three thousand pounds at a time.

It paid out $12,375 in rat bounties.

It printed and distributed 700,000 circulars and pieces of literature.

It disseminated a widespread knowledge of the mode of plague transmission, a broad interest in sanitation, and a general community sentiment in favor of cleanliness that has caused the mortality from contagious illnesses of all descriptions in San Francisco to fall below that of any other large city in the United States, and has left heart disease at the head of the fatal ailments in this City for the year in which the Committee was at work.

Today San Francisco is the healthiest large city in the United States and a person is in less danger of bubonic plague here than in any important seaport in the world.

In conjunction with the Federal, State, and City health authorities, and through the hearty co-operation of the people themselves, the Committee helped avert a general quarantine that would have set San Francisco back ten years in commercial development, and might have cost it the richest commerce of the Pacific for a generation to come.

It winds up its work by returning a nineteen per cent dividend to the paid-up subscribers to the sanitary fund, and tendering a grand banquet to Passed Assistant Surgeon Rupert Blue, in celebration of success and in recognition of his services in stamping out the plague.

CHAPTER XVI.

THE PEOPLE.

When the Citizens' Health Committee took up its work, there were not many mysteries left about bubonic plague as an epidemic, although the treatment of this epidemic was new. The mystery was about the people of San Francisco. How were they going to behave? The time had come when it was necessary that practically all members of the community should co-operate intelligently and vigorously, and for months in succession, not only to preserve their prosperity but their lives. How were they to be informed, educated, aroused to action, kept going through a long season of sustained effort, without cessation and without the sort of defection that would undo in one part of the City the work done in another part? Certain peculiarities of the people and of their recent history had to be considered.

Probably of all modern city communities, the San Franciscans are, as a class, the most careless, gay and free-spirited. Their most cherished right is the right to do as they please. They were known to be capable of hanging together in cliques, factions and parties, but their capacity for general concerted action had never been tested.

Their triumph over earthquake and fire was a triumph of individualism: it showed what could be done when everybody acted on his own initiative and took care of himself and his family and his business in his own way. There was plenty of mutual helpfulness, but no general following of orders from a central authority. There was, and still is, a strong feeling that official interference in that calamity did more harm than

STERILIZING A BUILDING

Fumigation. Note the man on the extreme left and the man on the extreme right spraying the cracks in the floors with insecticide to kill fleas and flea eggs. Note four pots filled with sulphur and set on bricks in pans containing water. Note the pile of oakum in the middle of the rooom to be used in filling cracks. Note the man against the rear wall pasting strips of paper over large openings to prevent the escape of the sulphur dioxide gas. Sulphur will be burned in the proportion of two pounds to the thousand cubic feet of initial air space. If properly done this will kill all animal and vegetable life in the room.

good. The people were a trifle tired of calamities, anyhow, and inclined to regard a fresh one as a nuisance.

In addition, their experience with bubonic plague had established the popular notion that it was something Chinamen had, and that if the San Francisco Chinese ever had it, which to many was doubtful, they had had it for twenty-five or thirty years, and the scientific gentlemen from the Eastern States were unduly alarmed about a few new cases.

It was also quite generally supposed that plague was a standing institution among the Hindus, that they always had it and that the carnivorous white people of India were immune. That was what some of the newspapers preached editorially, in order to support their denial that the disease was present.

Thousands of people in San Francisco were amazed when shown that the recent Indian epidemic made its appearance in Bombay no earlier than 1896. Thousands more were incredulous when told that of the 160 cases of plague occurring in their City between May, 1907, and February, 1908, only eight victims were Chinese and three Japanese, and of these but three contracted the disease in Chinatown.

These were the people the Citizens' Health Committee was called upon to convert to the view that they were threatened by "one of the great malign forces of nature" and that they were harboring and feeding in their shops, factories, granaries, warehouses, stables and kitchens the agents of its spread; and to arouse to a concerted effort at co-operative defense.

The task was one of stupendous difficulty and nobody knew where to begin.

CHAPTER XVII.

PRESENTING THE PROBLEM.

Two days after its appointment was announced the Committee met in the rooms of the Chamber of Commerce and adopted the title by which it has since been known.

Dr. Blue was present and told the members what he wished to accomplish. The rats must be destroyed. That involved radical changes in the habits of the people, which could only be effected through their voluntary co-operation. Rats were too clever to take bait or poison while they could get plenty of garbage from vacant lots and overflowing garbage cans, grain from stables, and scraps of food from chicken-yards. When starved and harried, however, they grew reckless, and would take poison and enter traps. There must be a sudden famine of rat food and a general destruction of rat harboring places throughout the City; such as could be brought about only by the efforts of the whole community. The community must be brought to realize that the rat was its most deadly danger, that it carried plague in its body, and hatched fleas in its nest for the transmission of the disease to man.

The people must be so educated on the subject that they would freely admit sanitary inspectors to their homes, assist them in their work, starve and hunt rats and turn in the bodies to plague headquarters, help the laborers of the sanitary forces demolish harboring places and trace rat runs to their nests,—and first, last and all the time, keep the garbage can covered and the garbage in it. He stated that he would be compelled to report, from time to time, the exact facts of the plague situation to the authorities at Washington, that he had

no control over their actions, and that the matter of quarantine depended on the conduct of the City itself.

At this meeting, Drs. Blue and Rucker exhibited maps of the City spotted with the locations of human cases of plague and the places where infected rats had been captured.

To the mortification of many present, the only sanitary part of San Francisco except a couple of outlying districts, appeared to be Chinatown.

THE ONLY GOOD RAT IS A DEAD RAT

Interior Ratatorium. Passed Assistant Surgeon Rupert Blue's headquarters. Here the captured rodents were tacked to shingles, the label showing when, where and by whom caught recorded, the shingle given a number, and then dipped in the antiseptic solution in the white pan. The rats were then opened and prepared for examination by the bacteriologist and pathologist. On the plain, lead-topped tables shown over 150,000 rats have been examined. The men employed in this work reached such a state of skill that it was no uncommon thing for them to prepare for examination 500 rats a day each. Note the sticky fly paper on the wall to capture flies which might be the means of transferring the infection.

CHAPTER XVIII.

GETTING DOWN TO WORK.

The problem of co-operative sanitation had been presented. The question was how should it be solved? There were several suggestions as to details, such as the appointment of a Committee on Press and Publicity; having contractors provide garbage cans for buildings under construction; action by the State officials against rats on the water front; increasing the rat bounty, and rat-proofing chicken yards.

Charles C. Moore, president of the Chamber of Commerce, suggested that the first thing to be done was to appoint an executive committee that should proceed to the appointment of working sub-committees representing all lines of trade and industry in the City, to arouse the community and get the people into action.

The meeting was also addressed by Dr. Parkinson, Dr. P. M. Jones, Dr. Evans of the State Medical Society and Dr. Foster, secretary of the State Board of Health; and by James McNab, T. C. Friedlander, Dr. Herbert C. Moffitt, and others. Those present felt that there was no time to lose. They decided that the Chair should appoint the executive committee of five.

The District Attorney sent a communication promising the active assistance of his office through the vigorous prosecution of offenders against the health laws, and a copy of his letter was forwarded to the Bar Association.

The Committee met next morning at 11 o'clock and the Executive Committee was announced.

Chapter XIX.

Organization of the Citizens' Health Committee.

The Citizens' Health Committee organized in the following manner, which was found effective:

There was an Executive Committee consisting of Charles C. Moore, chairman; Frank J. Symmes, Walter Macarthur, Gustave Brenner and Dr. George H. Evans. A. W. Scott, Jr., was afterward added, in place of Mr. Symmes, resigned. This committee was charged with the appointment of sub-committees of citizens in all lines of business and social activity, and, in conjunction with Dr. Blue, was given full charge of all work under the auspices of the Citizens' Health Committee, with power to make contracts and disbursements according to its own judgment.

To secure the co-operation of the press and prepare statements for publication there was a Press and Publicity Committee, consisting of T. C. Friedlander, chairman, and Dr. George H. Evans.

There was a Committee on Public Instruction, consisting of A. W. Scott, Jr., chairman, Frank J. Symmes, Walter Macarthur, and Dr. Harry M. Sherman.

The Committee on Enforcement of Laws comprised James McNab, chairman, R. H. Swayne and Dr. P. M. Jones.

The Committee on Sanitary Regulations was composed of Dr. H. C. Moffitt, chairman, Dr. P. M. Jones, Capt. H. W. Goodall, and Judge Walter B. Cope.

An Auditing Committee was appointed, consisting of Leon Sloss, chairman, Henry Rosenfeld and Gustave Brenner.

Dr. Harry M. Sherman was made a Committee on Schools.

Dr. Langley Porter and E. H. Rixford were made a Committee on Water Front.

There was a Bounty Committee, composed of E. H. Rixford, chairman, Dr. John M. Williamson and James McNab.

A Committee on Warehouses was appointed, consisting of Dr. Charles G. Levison, Dr. John M. Williamson and H. H. Sherwood.

L. M. King, secretary of the Merchants' Association, was made secretary, and former Mayor E. B. Pond, president of the San Francisco Savings Union, was made treasurer.

The offices of the Merchants' Association, in the Merchants' Exchange building, were designated as headquarters.

In addition to these special committees, forty-two Sub-Committees were formed by calling upon the leading citizens in the various lines of industry and trade, and social and fraternal organization, to work in their respective fields. These Sub-Committees were made up as follows:

ASSOCIATED SAVINGS BANKS.

R. M. Tobin, Hibernia Savings & Loan Society, Jones and McAllister.

George Tourny, German Savings & Loan Society, 526 California.

George A. Story, Mutual Savings Bank, 706 Market.

S. L. Abbott, Security Savings Bank, 316 Montgomery.

W. E. Palmer, Humboldt Savings Bank, 646 Market.

J. U. Calkins, Mechanics' Savings Bank, 143 Montgomery.

BAR ASSOCIATION.

H. U. Brandenstein, 250 Montgomery.

W. Denman, Kohl Building.

E. S. Heller, Heller, Powers & Ehrman, Union Trust Building.

M. I. Sullivan, Sullivan & Sullivan, Humboldt Bank Building.

D. Y. Wood, the *Recorder,* 130 McAllister.

KNIGHTS OF THE ROYAL ARCH.

Dr. Wm. J. Walsh, 1300 McAllister.

J. H. Spiro, 10 Biedeman St.

F. G. Roney, 1278 Market.

PACIFIC MACHINERY DEALERS' ASSOCIATION.

Thomas Rickard, Harron, Rickard & McCone, 436 Market.

A. L. Young, A. L. Young Machinery Co., 26 Fremont.

A. D. Gillespie, 298 Monadnock Building.

PACIFIC COAST HDWE. & METAL ASSOCIATION.

H. M. Haldeman, manager Crane Co., First and Howard.

A. L. Scott, Pacific Hardware & Steel Co., Seventh and Townsend.

E. W. A. Waterhouse, Waterhouse & Lester Co., 534 Townsend.

CALIFORNIA METAL TRADES ASSOCIATION.

James Kerr, Steiger & Kerr S. & F. Co., Thirteenth & Folsom.

George Henry, Pelton Water Wheel Co., Nineteenth and Harrison.

Harry F. Davis, Investors' Building, Fourth and Market.

BREWERS' PROTECTIVE ASSOCIATION.

J. A. Hieronimus, Secy. and Treas. Wunder Brewing Co., Scott and Greenwich.

U. Remensperger, president Enterprise Brewing Co., 1 Enterprise.

H. Thode, president Union Brewing & Malting Co., Eighteenth and Florida.

CALIFORNIA CLUB.

Mrs. A. W. Scott, chairman, 305 Buchanan.
Mrs. A. D. Bowen, 300 Twelfth Ave.
Mrs. A. P. Woodward, 312 Haight.
Mrs. Chas. Ward, 2335 Hyde.
Mrs. J. G. Walker, 2016 Franklin.
Mme. Emilia Tojetti, 2855 Scott.

RETAIL DRUGGISTS.

E. L. Baldwin, chairman, 20 Market.
C. A. Fuller, 2100 Devisadero.
W. B. Cheatham, 585 Mission.

CONTRACTORS.

J. W. McDonald, Merchants' Exchange Building.
A. E. Buckman, 636 Market.
D. J. O'Neill, 500 Hampshire.
Wm. H. Healey, 268 Market.
Broderick Jones, Eighteenth and York.
David R. Church, 107 Montgomery, (c/o Warren Co., Inc.)

DRAYMEN'S ASSOCIATION.

H. M. Englander, Jackson and Battery, (c/o Zellerbach Paper Co.)
G. E. Hart,
Geo. Renner, 24 Washington.
F. J. Devlin, 24 Washington.
Matt Harris, Fifth and Brannan.

STABLE MEN & CARRIAGE OWNERS' ASSOCIATION.

J. J. Fagen, 618 Gough.
L. C. White, 313 Van Ness.
W. J. Gallagher, 623 Grove.

Merchants' Exchange.

F. A. Somers, chairman, 37 California.
E. B. Cutter, Merchants' Exchange.
L. A. Kelly, 897 Ellis.
E. C. Horst, 215 Pine.

S. F. Real Estate Board.

T. D. Boardman, 508 California.
Geo. H. Lent, 51 Geary.
John T. Harmes, 30 Montgomery.
R. E. Fazackerley, 318 Kearny.
R. P. Burns, 20 Montgomery.

Ship Owners' Association.

Capt. H. C. Howard, 3739 Clay.
Capt. Jacob Jansen, 172 East St.
Dr. Joseph Oliver, 40 Clay.

Mission Promotion Association.

P. J. Healy, 14 Laidley.
J. W. Maguire, 3320 Twentieth.
F. Hichborn, Fifteenth and Mission.
Glen Miller, Hotel El Drisco, 2901 Pacific Ave.
R. E. Splaine, 2912 Twenty-fourth.

Commercial Banks.

P. N. Lilienthal, chairman, Anglo-Californian Bank, Pine and Sansome.

H. Fleischacker, London, Paris & American Bank, Sutter and Sansome.

E. W. Wilson, American National Bank, 427 California.

R. J. Tyson, Seaboard Bank, 34 Market.

James Rolph, Jr.

RETAIL POULTRY DEALERS.

Cecil Raymond, Eleventh and Market.
Aaron Miller, 1524 Polk.
Tim O'Brien, Golden Gate Ave., near Webster, (c/o California Market.)

RETAIL FRUIT DEALERS.

Frank Galli, 1444 Polk.
K. N. Warris, 1537 Buchanan.
F. A. Marino, 1131 McAllister.
L. G. Alletta, 287 Sanchez.
A. Farello, 136 Fillmore.
John L. Dumbrell.
Charles L. Goetting.

RETAIL BUTCHERS' COMMITTEE.

F. J. Sinclair, 628 Montgomery.
Henry F. Schwab, 700 Devisadero.
John B. Cabossel, 2318 Fillmore.
W. F. Roberts, 2847 California.
Edward G. Brugge, 2249 Clement.

FIRE UNDERWRITERS.

B. Faymonville, Firemens Fund, 401 California.
C. Mason Kinne, L. L. & Globe, 444 California.
D. E. Miles, Westchester, 40 Sutter.
C. A. Henry, Sun Fire Ins. Co., Montgomery Block.
B. J. Smith, Connecticut Fire, 518 California.

PERMANENT DOWN TOWN ASSOCIATION.

H. V. Ramsdell, Kearny and Post.
Horace Allen, 717 Market.
R. W. Costello, Van Ness and Pine.
P. T. Clay, Kearny and Sutter.
Grant Ward Smith, 1541 Van Ness.

This Sort of Thing had to Go

One of the most insanitary lines of business is that of the collection of junk and rags. It is a matter which is particularly objectionable, as on numerous occasions, notably in the case of the epidemic of Marseilles, the disease has been transported through the medium of rags. It is not at all improbable that other diseases, notably actinomycosis and anthrax, are constantly carried in this manner. The rags come from various sources. They exist in the mills as clippings and are mingled with the dust and other debris swept off the floor. They are also found in garbage cans and amongst piles of refuse and are frequently covered with human and animal excretions. The place here shown furnished infected rats and has been condemned and destroyed.

WHOLESALE BUTCHERS' ASSOCIATION.

E. G. Rodolph, 1314 Merchants Exchange.
T. J. Harrington, 732 Oak.
Louis Noonemann, Fifth and Natoma.

S. F. HOTEL MEN'S ASSOCIATION.

J. D. Barker, chairman, Hotel Stewart, 353 Geary.
Gustav Mann, Hotel Majestic, 1500 Sutter.
O. Rich, Fairmont Hotel, California and Mason.

BOTTLERS' PROTECTIVE ASSOCIATION.

T. J. O'Brien, chairman, 2 Kansas.
A. E. Kroenke, Eighteenth and Florida.
Louis R. Levy, 349 Grove.

INSURANCE BROKERS.

J. R. Hillman, chairman, 160 Sansome.
Geo. H. Foster, 602 California.
S. J. Miller, 440 Collingwood.
Jeremiah Deasy.

CIGAR DEALERS.

Milton Esberg, chairman, California and Front.
Arthur Bachman, Commercial and Front.
Alexis Ehrman, 112 Front.

FRATERNAL ORGANIZATIONS.

H. T. Smith, chairman, 376 Lexington Ave.
D. S. Hirschberg, 2313 California.
Geo. Draghecivich, 1896 Union.

Bakers.

W. J. Claus.
Harry Banshaf.
Jacob Eppler.
Charles Loesch.
Albert Komsthoeft.

Restaurants.

Frank Swain, 1241 Van Ness.
Jacob Meyerfeld, The Louvre.
F. W. Krohn, 911 O'Farrell.
J. M. Jcarto.
T. S. Cross, 726 Turk.

Building Trades Council.

O. A. Tveitmoe, 10 Turk.
A. L. Hollis, 153 Noe.
A. E. Smith, 205 Guerrero.
T. J. Mackey, 10 Turk.

Wholesale Fruit and Produce Merchants' Protective Association.

J. G. Wetmore, 450 Front.
R. K. Malcolm, 101 Washington.
E. Davis, 502 Davis.

The Builders' Exchange.

S. H. Kent, 180 Jessie.
James A. Wilson, 180 Jessie.
Richard Herring, 180 Jessie.
Wm. Rainey, 180 Jessie.
John Tuttle, 180 Jessie.

ASSOCIATED RETAIL GROCERS.

Malcolm Brock, 3325 Sacramento.
John Lackman, Steiner and Hermann.
John Schomer, 3149 Twenty-fourth.
James Irvine, Bush and Franklin.
J. M. Sullivan, 17 Oak.
Gus Lehrke, 627 Tennessee.
Antone Lietich, 1995 Union.
Henry Von Issendorf, 1295 Page.

JAPANESE ASSOCIATION.

T. Hodsumi, Yokohama Specie Bank.
Dr. K. Kurosawa, 2008 Pine.
J. Koike, 1172 Sutter.
K. Abiko, 1525 Geary.
M. Tsukamoto, 3500 Twenty-third.

SAN FRANCISCO LABOR COUNCIL.

Andrew J. Gallagher, 416 Oak.
Timothy A. Reardon, 409 Laguna.
E. H. Misner, 1695 Market.

GREEK COMMITTEE.

N. Valianos, 330 Third.
Tasos Mountanos, 826 Folsom.
J. Papadopulos, Sixteenth and Mariposa.
M. D. Vanvales, 2104 Leavenworth.

PRINTERS.

B. S. Hubbard, 741 Harrison.
H. Levison, 1532 California.
Max Schmidt, Second and Bryant.

A. Kohlberg, 967 Golden Gate.
Jas. Schwabacher, 42 Sutter.
E. A. Hanrahan, 1128 Mission.

Stationers.

B. S. Hubbard, 741 Harrison.
W. J. Getty, 42 Sutter.
T. E. Amann, 215 Montgomery.
E. H. Wobber, 1125 Van Ness.
Albert Kahn, First and Folsom.

Builders' Association.

J. J. Stahl, 400 Kearny.
C. M. Lindsay, 400 Kearny.
G. G. Gillespie, 400 Kearny.
J. L. Munster, 400 Kearny.
W. S. Lewis, 400 Kearny.

Master Painters' and Decorators' Association of S. F.

J. C. Romaine, 1067 McAllister.
Thos. Simpson, 2905 Folsom.
Max Cohn, 1038 Golden Gate.

Milk Dealers' Association.

Geo. C. Smart, 1884 San Jose Ave.
O. Crook, 1814 San Bruno Ave.
I. Leipsic, 1421 Buchanan.

Wholesale, Retail and Commission Dry Goods.

R. B. Hale, Sixth and Market.
Frank Warren, Post, bet. Kearny and Grant.
Lazare Klein, 41-47 Sansome.

Max Davis, California and Van Ness.
J. J. Priester, 2635 Mission.
H. Lippman, 2580 Mission.
W. R. Davis, 2700 Mission.
L. Simons, 658 Mission.
Geo. H. Robinson, Aronson Building.
J. D. Isaacs, 1413 Devisadero.
B. J. Schmidt, 35-37 Sansome.

JEWELERS, WHOLESALE AND RETAIL.

Bruce Bonny, Shreve & Co.
Fred H. Levy, M. Schussler.
R. L. Radke, Bush and Van Ness.
H. H. Allen, Morgan & Allen.

RETAIL HARDWARE DEALERS.

B. C. Brown, 950 Van Ness Ave.
F. B. Dickson, Monadnock Building.
J. N. Brittain, Van Ness and Turk.

With the approval of the District Attorney, the president of the Bar Association appointed four committees to take charge of the prosecution of health cases in the police courts. They comprised the following attorneys:

Committee No. 1—F. P. Deering, Chairman, J. F. Bowie, Nathan H. Frank, Burke Corbet, L. S. Beedy.

Committee No. 2—J. C. Campbell, Chairman, I. I. Brown, Frank H. Powers, F. J. Solinsky, E. T. Cooper.

Committee No. 3—Charles S. Wheeler, Chairman, M. E. Cerf, William Denman, A. G. Eells, Oscar Sutro.

Committee No. 4—W. F. Herrin, Chairman, C. H. Wilson, Charles Heggerty, John T. Davis, J. F. Sullivan.

The Committee on Sanitary Regulations, of which Dr. Herbert C. Moffitt was chairman, made these recommendations, as a sort of general preliminary plan:

1. The employment of a sufficient number of sanitary inspectors to cover the entire City at least once in forty-eight hours.

2. The clothing of these inspectors with sufficient authority by having them appointed special police officers and deputies to the Health Department. This authority has been promised by the presidents of both the Police and Health boards.

3. That for the effectual prosecution of offenders against the sanitary laws and regulations of the State and Municipality, the services of the Bar Association, which have already been promised with the approval of the District Attorney, be accepted, and that a competent attorney be employed to see that the representatives of the Bar Association are informed of all cases that are to be called for hearing, and that the necessary witnesses shall be in attendance.

4. (As amended by the Committee.) That the Citizens' Health Committee take immediate steps to collect by further subscriptions the sum of $500,000, for the employment of 750 additional inspectors, the purchase of necessary supplies and for such other methods as may be deemed necessary by the Executive Committee.

5. (As amended.) That the Executive Committee together with Dr. Rupert Blue, of the United States Public Health and Marine Hospital Service, have full charge of all work under the auspices of the Citizens' Health Committee, and that they have full power to make all contracts and disbursements which may in their judgment be advisable.

CHAPTER XX.

FORMING THE SUB-COMMITTEES.

Of the agitation that followed, the Sub-Committees were the most effective agency. Their work was vital. On them depended the spread of the propaganda from the scientific director of the campaign into the kitchens and door-yards of the City; the transforming of an untried theory into a famine among the rats and a clean bill of health for San Francisco.

The main item of the Executive Committee's problem was to influence the house-wife. The obvious way to influence the house-wife was through the man of the house. The best way to reach him was through his employer; the employer must tell him, in good, strong language, that if plague once got its grip on the City there would be no more business, and no employment for anybody.

The way to reach the employer was to send the warning to him through a sub-committee of the leading men in his particular line of business. The Sub-Committee would best be appointed by a special meeting of the established organization of a given line of business, if there were one, and if not, one must be made to order. The meeting itself must be carefully indoctrinated and thoroughly aroused, so that everybody would go to work at once.

With this purpose in view, the Executive Committee took the classified list of the City directory, picked out the more important lines of business, and sent for the most energetic men in those lines. Those that came did not attend simply because some general sort of routine invitation had gone

THE KIND OF STABLE THAT WAS CONDEMNED

Conditions following the fire placed stables at a premium. The dwelling here shown stood in a street every house of which had a stable underneath it. This building has been vacated and condemned. Note the condemnation notice on the door. The street furnished both human and rodent cases. This type of house and street should be the initial point of attack in any plague campaign.

forth. They were called up by phone or visited personally and their attendance was demanded as a duty to their City. The first charge laid upon them was to visit every man in their business and make him clean up and go to killing rats, call meetings of his employees, tell them what threatened, and make them, their families and their household servants enlist for the rat war. The next, was to form a Sub-Committee, then and there.

These meetings were held successively and simultaneously, in continuous performance, in several offices of the Merchants' Exchange Building, from morning till night, until all the principal Sub-Committees had been formed. The members of the main Committee worked on them in relays, assisted usually by a surgeon from the sanitary corps. An account of one will indicate in a general way the tactics employed.

Chapter XXI.

The Opening Guns.

For example, the retail butchers and produce dealers were summoned to a meeting at the Chamber of Commerce. One hundred and twenty-one shops were represented. A member of the Executive Committee bluntly told them they were under the suspicion of the health authorities and if they and everybody else in the community did not conduct their business and domestic arrangements differently, in sixty days the City would be quarantined and they would have no business to conduct.

Dr. Rucker lectured them about rat-extermination at their stores and urged them to inspect their garbage cans at home; to see that they were of metal, water-tight, and fitted with a rat-proof cover. He also told them that the women of San Francisco were entering into the movement, and that housewives were reaching a general understanding that no butcher shop, vegetable stall or fruit stand that was not clean and wholesome, and above suspicion of the presence of rats or filth, ought to be patronized. He warned the produce men not to leave fruit and vegetables exposed to rats, and not to scatter vegetable trimmings, banana skins, and similar refuse anywhere about their places, nor permit it to be done, but to take care of all such material in rat-proof receptacles. The butchers were, generally speaking, given to throwing meat scraps into open wooden bins under their counters, where the rats resorted for banquets. He demanded that they substitute metal refuse boxes for these bins, and keep them covered.

To show that it was no sham battle, another member of the Executive Committee followed Dr. Rucker with the statement that if appeals to their intelligence, self-interest and citizenship failed to enlist their help, prosecutions would follow, negligence would be advertised, and the "big stick" would be swung with all the energy of desperation. He said further:

> Until ten days ago I did not believe this danger existed; I scoffed at the menace which hangs over San Francisco. I now know, as Mr. Brenner has said, that we are confronted with an impending quarantine which will ruin your business and mine, if within sixty days we do not satisfy the Federal authorities that the plague is obliterated.
>
> This is now a question of the preservation of lives and of business. I do not know what you men will do, but I do know that if this City is quarantined I will have to go out of business, and I and many others do not intend to be driven out of business by the negligence or criminality of any one class of merchants.
>
> While I do not like the word "threat," yet I am compelled to tell you that if our appeal fails we threaten. We have the money and the men, and we intend to see that the sanitary laws are enforced. Inspectors will visit your places of business, and if you are negligent, or if any one about your places is negligent, we will prosecute. The Bar Association has offered us able lawyers to conduct prosecutions and we will see that maximum penalties are enforced. Neither political pull nor anything else will serve. Any judge or lawyer who tries to do politics with this condition impending will be damned henceforth in this community. The crisis is here, and it is up to you men to do your part in exterminating the rats.

Dr. Gunn, the health officer, supplemented these remarks, urging the butchers to constitute themselves health inspectors.

Immediately following these addresses it was announced that there would be a general meeting of the retail Butchers' Association at 44 Eddy Street, at which a systematic plan of campaign would be considered and acted upon, and at that meeting an effective sub-committee was named.

If, as in the above case, there was already an organization in a particular field of industry, it was charged with the duty of naming the Sub-Committee; but where none existed those summoned to the meeting were requested to organize and appoint such a body on the spot. They were then turned into another room to hold their own meeting, while another deputation was called in and put through the same process. One particularly refractory delegation was given ten minutes, while the Executive Committee left the room, to organize. It had been disposed to do nothing, but when the Executive Committee returned the Sub-Committee had been appointed, and it did some of the best work of the campaign, in the worst part of the City.

The first week's grist of meetings will illustrate the Committee's manner of going to work. Within five days of its appointment it had arranged the following schedule, and issued the calls:

Tuesday, February 4, 11 a. m.—Rooms of the Chamber of Commerce: The Draymen's Association, Stable and Carriage Owners' Association, Street Contractors and Teamsters of San Francisco.

Tuesday, February 4, 11:30 a. m.—Meeting of Grain Dealers on the floor of the Merchants' Exchange.

Tuesday, February 4, 1:30 p. m.—Rooms of the Chamber of Commerce: Lumber Dealers' Exchange, San Francisco Real Estate Board.

Wednesday, February 5, 11 a. m.—Rooms of the Chamber of Commerce: Pacific Machinery Dealers' Association, California Metal Trades Association, Pacific Coast Hardware and Metal Association.

Wednesday, February 5, 1:30 p. m.—Rooms of the Chamber of Commerce: Barbers' Association.

Wednesday, February 5, 3 p. m.—Rooms of the Chamber of Commerce: Bankers' Association.

Thursday, February 6, 11 a. m.—Rooms of the Chamber of Commerce: California Traffic Association, Automobile Dealers' Association.

Thursday, February 6, 12:15 p. m.—Builders' Exchange—at their rooms.

Friday, February 7, 11 a. m.—Rooms of the Chamber of Commerce: Ship Owners' Association.

The meeting with the San Francisco Real Estate Board and the Lumber Dealers' Exchange brought out about forty of the leading men of these lines. So did the one held the same day with representatives of the Draymen's Association, the Stable and Carriage Owners' Association, and the Street Contractors. While the latter meeting was going on, a similar one, of grain dealers, took place in another part of the same building; and the next day there were meetings with representatives of the Pacific Machinery Dealers' Association, the California Metal Trades Association, and the Pacific Coast Hardware and Metal Association.

The fraternal orders were not overlooked. Measures were taken to have rat destruction and general sanitation efforts urged on attendants at every lodge meeting in the city, from the Masons to the Eagles, from the Red Men to the Native Sons of the Golden West. The first meeting with representatives of these societies was attended by 104 delegates, who could reach, it was estimated, through the secretaries of their various lodges, nearly 100,000 persons. They were supplied with printed matter for that purpose. One of the best pieces of literature put out during the campaign was the work of a lodge of Elks. It appears in the appendix.

WHAT A PLAGUE SPOT IS

Cleaning out a focus of rodent plague. In the left-hand corner, near where the man is standing, five infected rats were found. This was in the rear of a grocery store, and rats were attracted by the uncovered bags of potatoes in the yard.

This process was carried through all the more important fields of industry and organization in the community. Many that attended the opening meetings were puzzled by the suddenness of the turn of affairs. Many more were skeptical and some were inclined to be obstinate. They knew of no plague. They had seen no epidemic. Even if there were plague, those Chinamen would have to take care of themselves this time. It was admitted that there were no human cases in the City, and some of the newspapers said there never had been. They could not see what all the bother was about.

This attitude soon changed. The unprejudiced were educated and the skeptical were scolded into line. No human throat could stand the work indefinitely, and the members of the Committee and of Dr. Blue's staff took turns at laying down the law.

It should be said here, that while all the members of the Committee gave freely of their time and energies as called upon, yet the incessant and well-directed labors of L. M. King, who acted as secretary of the general body and of all Sub-Committees, is worthy of especial mention. His long services as secretary of the Merchants' Association had given him an experience and a wide acquaintance in the City that were invaluable in this work.

Chapter XXII.

A City of Meetings.

For several months San Francisco was a city of meetings. The Committee employed a special agent to help arrange for them and they were soon going on all over town at once. School-houses, churches, offices, stores, lodge-rooms and factories were pressed into service. Noonday meetings of workingmen were held at industrial plants and on building jobs, and speakers were whirled about in automobiles to address them. Sometimes ten or a dozen meetings would be held on the same day, and as many on the same evening. Missionaries went out to talk about rats to any gathering they could get at—school children, mothers' clubs, men's clubs of the churches, local improvement clubs—any group of people, large or small, that could be held together long enough to be lectured.

The persons in the various parts of the City or the different lines of industry that were incited by the Committee to call these gatherings together were promised speakers that would explain the situation and tell the audiences what was needed, and if no member of the Committee could go, it sent some one from a list of volunteers or called on the health authorities for a man. Here is a typical order, sent by the executive officer of the Federal health brigade, Passed Assistant Surgeon Colby Rucker, to a district commander:

401 Fillmore Street,
San Francisco, Cal., February 15, 1908.

Passed Assistant Surgeon C. W. Vogel,
In Charge Fifth Provisional Plague District, San Francisco, Cal.

Sir:

You are directed to report at the following named places and times for the purpose of delivering an address on the subject of "Bubonic

Plague." Pay particular attention to the mode of spread and methods to be used by the lay public in avoiding and eradicating the disease.

Devisadero Street Improvement Association—1544 Devisadero Street at 8 P. M.—Tuesday, February 18, 1908.

Police Officers—Co. A, 64 Eddy Street at 3:30 P. M. Monday, February 17, 1908.

Calvary Presbyterian Church, Fillmore and Jackson Streets, Tokalon Club, at 8:30 P. M. Friday, February 21, 1908.

By direction of the Commanding Officer.

For practically all members of the sanitary forces, City, State and Federal, it may be said that they were willing to work all day and half the night if they could only succeed in getting the enemy under foot.

The Committee on Public Instruction and Organized Bodies, of which A. W. Scott, Jr., was chairman, was entrusted with the task of arousing popular interest and sentiment for two purposes—one for securing popular coöperation in order that individual work might be done in the cleaning of homes and places of business; the other that sufficient interest might be aroused to insure the collection of a large fund.

To accomplish these objects, meetings were called of all organizations in every part of the city. One hundred and sixty-two meetings of this sort were held and addressed in six weeks' time.

For the collection of money, a system was adopted of calling together different lines of trade. Forty-two different trades meetings were held and committees appointed from each, which went actively to work gathering in the money. Some of the most prominent citizens volunteered their services to act as speakers at these different meetings, which were held simultaneously in all parts of the City.

The Citizens' Health Committee is thoroughly convinced of the great value of such meetings as a way of spreading information and animating people to action; the man-to-man conveyance of ideas through personal contact being an essential element in the propagation of the right sort of social sentiment. All the different elements of the community were soon involved, from the bank to the barber-shop, from the Sunday school to the saloon. Before the year was out it got so that a man could hardly go into a church to pray or into a cigar store to punch a slot machine that he did not hear something about rats and the plague.

CHAPTER XXIII.

WORK IN THE FIELD.

In the meantime a large force of inspectors, rat-catchers and laborers had been put into the field, the Committee having authorized Dr. Blue to add four hundred men to his organization for the Committee's account. Dwellings, markets, restaurants, hotels, bakeries, theaters, churches, warehouses, slaughter-houses, factories, chicken-yards, and every sort of place that could possibly harbor and feed rats were examined daily. If found to be dangerous they were condemned and the owners were compelled to make them rat-proof. Plank walks were torn out of back yards, rat nests were demolished and their materials and flea eggs swept together and burned; suspected houses were disinfected and fumigated, accumulations of household rubbish were dragged out and destroyed. The sick were visited and the dead inspected. Wherever plague was found in rat or man, a horde of rat catchers descended on that place and trapped every rat for four blocks around to prevent the hunted animals from carrying the infection any farther. These processes are described in detail in an article by Dr. Blue, which will be found in the appendix. It was this sort of work the Committee was called upon to assist by educating the public; and it went on in the field unceasingly all the time the Committee was at work among the people.

Chapter XXIV.

Financing the Campaign.

It was not originally the purpose of the Committee to raise and disburse money for sanitation, as, in the absence of precedents for an enterprise of this sort, it was supposed that the only thing needed was to secure the coöperation of the people with the authorities. It soon became evident, however, that the job was larger than any one had supposed, and that in order to satisfy the determination of the Committee to stamp out the plague and get the City a clean bill of health before warm weather came, it would be necessary to put a much larger force of men in the field than Dr. Blue and the local Board of Health were able to provide. Half a million dollars seemed little enough for such a contract.

The people of San Francisco, themselves, made the expenditure of so much money unnecessary. Once informed and aroused, they cleaned up most of their own city by cleaning up their own premises. Had it not been for their prompt and intelligent action, half a million might have been but a beginning. The work they did, in inspecting and cleaning up, represented a value of hundreds of thousands which does not appear in this report; this in addition to what was spent by individuals for rat-proofing and permanent improvement.

The appointment of a Finance Committee to raise the half-million dollars was moved on February 13, and it was decided to leave the matter to the Executive Committee, which had full power to act. On February 17 the Execu-

tive Committee appointed Messrs. Leon Sloss, William A. Magee and E. R. Dimond as the Executive Finance Committee, and later appointed an auditing committee consisting of Gustave Brenner, Leon Sloss and Henry Rosenfeld. Lester, Herrick & Herrick, certified public accountants, were engaged to devise a special scheme of accounting and auditing the accounts. Later the secretary was appointed disbursing officer and authorized to sign individual checks in payment of salaries to the inspectors, laborers and rat catchers employed for the Committee's account.

There was also an Advisory Finance Committee, consisting of Raphael Weill, Richard Tobin, Percy T. Morgan, E. J. Molera, Rudolph Spreckels, P. C. Rossi, H. U. Brandenstein, H. W. Van Sicklen, I. W. Hellman, Jr., Wm. Haas, Wakefield Baker, John A. Britton and Garret McEnerney.

The method of agitation through sub-committees was applied to the raising of funds. Men known to stand well in the business community and to have personal influence with their associates were drafted into the service. Chairmen of sub-committees were called upon to serve as a general finance committee, and some others were appointed to reach the people in their various lines.

Firms and individuals were regularly and definitely assessed in proportion to their estimated financial status, and when the Committee waited upon them with a subscription book it was usually able to demonstrate that the assessment was, roughly speaking, just. Where argument was needed the most potent one was not the danger of plague but of quarantine.

The examples of some of the large corporations whose managers knew the danger that threatened and did not attempt to shirk their share of the common burden was of great financial assistance. The Southern Pacific Railway

EVICTING RODENT TENANTS

Sidewalks covering rat catacombs removed preparatory to replacement by concrete—one of the most important means of destroying the habitation of the rat.

was assessed $30,000 and paid it. The Santa Fe was assessed $15,000 and paid it. The United Railroads, in spite of its losses and labor troubles in San Francisco, contributed $5,000. The Standard Oil Company gave $5,000. The Brewers' Protective Association contributed $10,000. At the first meeting of the Executive Finance Committee, Mr. Faymonville, for the Fire Underwriters, tendered a check for $10,000, which was exactly the amount assessed to them, although they were unaware of it. The savings and commercial banks and the large commercial institutions gave approximately what they were assessed. The Committee tried to give everybody a chance to contribute, and the sums ranged from the above amounts down to fifty cents in the cases of some individuals. The amount thus collected by the Citizens' Health Committee came to $177,512.38. D. O. Hagens was made secretary to the Finance Committee.

In November, 1907, Dr. Blue had reported that the expenses of anti-plague operations in San Francisco were about $50,000 a month, and that most of it was being borne by the City. The Government was then paying merely the expenses of the plague laboratory and the salaries of the officers sent here, while the City paid for the labor, materials and transportation. Between August, 1907, and June, 1908, the City spent $192,000 on account of the plague, in addition to its regular health appropriation, and the drain was growing too great, notwithstanding the fact that the State had spent $20,000 and the Federal Government $210,000. In May the Supervisors passed the following resolution:

WHEREAS, For many months past extensive sanitary operations have been conducted in this City by the United States Public Health and Marine-Hospital Service, the San Francisco Board of Health and the Citizens' Health Committee, whose operations have brought the sanitation of this City to so high a state of excellence that there has not

been a single case of plague on this peninsula since January 30, 1908; and

WHEREAS, The Board of Supervisors of the City and County of San Francisco has coöperated with these authorities in this sanitary campaign by liberal appropriations of public moneys and by the enactment of numerous sanitation and health ordinances in the past; and

WHEREAS, The citizens of San Francisco have supported this campaign by large subscriptions to meet the exigencies of the occasion, and the expenditure of sums aggregating very large amounts in destroying, rebuilding and remodeling premises to comply with the City ordinances; and

WHEREAS, It is necessary that this work should be continued actively for some time if plague is to be permanently eradicated from this peninsula, where it is a menace not only to the health of San Francisco, but to the entire United States. Therefore, be it

Resolved, That it is the opinion of this Board of Supervisors that all future expense of sanitary operations should be borne entirely by the Federal Government in the same manner as the expense of war or that of any other matter of national importance, and that the Mayor appoint a committee of five to act with him in having this matter properly presented to the authorities in Washington.

Mayor Taylor appointed these gentlemen to serve as the Committee created by the resolution:

Andrew M. Davis, president of the Merchants' Association; William J. French, secretary and treasurer San Francisco Typographical Union, No. 21; Charles C. Moore, president of the Chamber of Commerce; Dr. William Ophuls, president of the City Board of Health; Allan Pollok, supervisor City and County of San Francisco.

The Committee presented the facts to President Roosevelt and petitioned him:

First. To continue the present allowance to the United States Marine Hospital authorities here for salaries, or whatever salaries the urgencies of the situation may require until this City is manifestly free from the disease, and also

Second. To allow the expense for dead-inspectors, rat bounty, supplies, and transportation, at present borne by the City and the Citizens' Health Committee.

By the latter part of November, 1908, the Federal Government, in response to this petition, took up the entire financial burden, except the expenditures for what were designated as non-expendible supplies, such as picks, shovels, brooms, rakes, axes, pitchforks, sprinkling-cans and other pieces of apparatus that would have burdened the Marine Hospital Service with a troublesome property accountability. Practically none of this material has been lost, and except what part has been destroyed in use, it is all the property of the City.

Chapter XXV.

Work of the Sub-Committees.

When the Sub-Committees were formed they reported their names, addresses and telephone numbers to the Secretary, and then went out to labor in their respective fields. They were given a few days to get started and then there was demanded of them an accounting of performances. Before the middle of February it was evident that the town was beginning to wake up, for representatives of the Sub-Committees were ready to report some sort and quantity of work done—a beginning, at least.

Some excerpts from Sub-Committee reports will show about how this part of the campaign was taken care of.

The real estate agents were in contact with thousands of householders through their rent collectors, and had an organization of their own that offered a chance of concerted action. Their Sub-Committee reported in part as follows:

A committee consisting of five members, each representing a real-estate firm that had a large rent-collection business, was appointed by the San Francisco Real Estate Board to devise means for giving such aid as could be afforded by the real-estate fraternity.

Through this committee, the cards issued by the Citizens' Health Committee relative to the precautions to be taken by householders were distributed to the various real-estate houses, particularly those who included in their business the collection of rents and thus came in touch directly with large numbers of householders. These firms sent the cards and circulars by their collectors to the tenants whose rents were collected. Thus were distributed information and advice to all sections of the City within a very short time. In this way the Committee distributed approximately twenty thousand each of the circulars and cards.

The collectors of rents were instructed by their employers not only to leave the circulars at the houses, but to add a few words of caution in order to emphasize the vital importance of complying with the sanitary regulations, and to suggest further that each householder should report any abuses which might come to their knowledge in their respective neighborhoods. To some extent also, real-estate solicitors whose work took them among property owners also distributed the literature and suggestions. The circulars and cards were also placed on the counters and in some cases in the windows of the real-estate offices for a similar purpose.

In addition to the dissemination of this literature, the collectors of the various real-estate offices were requested to inspect the premises which they visited, particularly with relation to the disposal of garbage. Where improper receptacles were found or lax methods were noted, reports were made to the offices; by which, demands for reformation of abuses were made, and such complaints were followed up until the proper precautions were observed.

The Committee also requested the various real-estate offices to advise them of any abuses or infractions of the sanitary laws that were observed and that could not be handled by the real-estate agents interested, and thus a great many complaints were transmitted by the Committee to either the Federal or the City health authorities.

As a large number of the rent collections of the Mission District are handled by real-estate agents not members of the San Francisco Real Estate Board, circular letters were addressed by the Committee to all the real-estate agents in the Mission, calling their attention to the work in progress and asking their coöperation, and also inviting them to attend a meeting which was held under the auspices of the Mission Improvement Club and at which addresses were made by several members of the Citizens' Health Committee as well as by two of the Federal officers.

Yours very truly,

T. D. BOARDMAN.

The Sub-Committee of the Associated Savings Banks reported in part as follows:

Under the direction of the Association, each and every savings bank took the literature prepared by your Committee, and delivered it personally to their clients—not only to depositors, but also to their bor-

rowers—with the request that they give this matter personal attention and follow out the suggestions made.

By this means we were enabled to bring this matter directly home to a large percentage of the residents of San Francisco; and, naturally, coming as a personal appeal from the savings banks, it seemed to have a great weight with the people in whose hands the literature was placed.

Trusting I have given you the information desired, and congratulating the Citizens' Health Committee for the good and effectual work done by them, Yours very truly,

W. E. PALMER,
Secretary Associated Savings Banks of San Francisco.

From the Pacific Machinery Dealers' Association:

GENTLEMEN:

Immediately on their appointment our Committee went to work among our various members and on explaining the situation were assured of the enthusiastic support of all upon whom we called. Stores and warehouses were given a complete overhauling and cleaning, sealed galvanized-iron garbage cans were provided in all such places, and traps and poison set for rats. Employees were carefully instructed in the same way and regularly made reports of conditions in their own homes and neighborhood, and I can assure you from the constant calls our Committee made that every one was most conscientious in all this work, and, as you know, liberal subscriptions were made by all to the cause of fighting the plague. Yours truly,

PACIFIC MACHINERY DEALERS' ASSOCIATION,
THOS. RICKARD,
Chairman Sub-Committee.

The Sub-Committee from the Pacific Coast Hardware and Metal Association, H. M. Haldeman, chairman, applied close business methods to its work, not only demanding an accounting from employees of the Association's constituent firms, but sending a "follow-up" letter after the blank forms on which the accounting was to be rendered. Its report reads as follows:

MR. L. M. KING, *Secretary, Citizens' Health Committee,*
1233 Merchants' Exchange Building, San Francisco, Cal.

DEAR SIR:

Replying to your favor of the 29th ult., our Committee had under its supervision the wholesale hardware houses, the wholesale carriage and wagon-supply houses, and the wholesale plumbing-supply houses. We called personally on each firm, explained the situation fully, asked them to call meetings of all their employees to impress upon them the seriousness of the conditions which confronted us, and wherever possible these meetings were addressed by members of the Committee. We made up lists of questions in typewritten form, with blank space left for the answer, which were distributed among all the employees of the various houses, the idea being to find out whether or not they had followed the suggestions made as to the cleaning up of their premises and keeping supervision over the premises of their neighbors. A few weeks later these same questions with additional questions were sent out in the form of a "follow-up," in order to keep the subject before them.

I trust this gives you the information that you require and beg to remain Yours truly,

H. M. HALDEMAN.

The blank form issued to employees by this Sub-Committee will be found in the appendix. It is regarded by the general Committee as a particularly valuable way to secure sanitation work in the homes of employees.

The Sub-Committee from the retail cigar dealers, Milton H. Esberg, chairman, issued placards to the cigar stores, and also followed up its work by correspondence. Its report follows:

MR. L. M. KING, *Secretary Citizens' Health Committee,*
City.

DEAR SIR: Your Sub-Committee on Cigar Dealers carefully examined the premises of virtually all cigar stores and stands throughout the City and found cheerful helpers in all sections among the handlers of this class of merchandise.

REAL CLEANING UP

Workmen of the Public Health and Marine Hospital Service destroying a rat focus beneath a boarded backyard. The debris that is being raked into a pile preparatory to incineration is composed of rat-nests swarming with fleas. This backyard and all others like it have since been covered with concrete, making them rat-proof and sanitary.

The placarding of the premises with data covering these sanitary demands bore excellent results in that the dealer felt it not only necessary to keep his premises in apple-pie order, but to impress the same requirement upon the many people who discussed the plague situation with him as the serious topic of the day.

The method applied for the extermination of the rat was that as prescribed by the Federal authorities on your Committee, and a general campaign of education was waged among the cigar men in order to acquaint them with the seriousness of the situation.

We also had printed and circulated a set of questions relative to the sanitation of the individual premises, which questions demanded answers as to what had been accomplished by the individual in the way of satisfying the situation and these questions also incorporated the premises of the dealer's or clerk's neighbors so that a wide area was covered.

Funds were raised from a very large list of people, the sums ranging from $1 to $500. Yours very truly,

MILTON H. ESBERG,
Chairman.

For the Mission Promotion Association, comprising several improvement clubs, the Sub-Committee, P. J. Healy, chairman, made this report early in the campaign:

We held a mass-meeting in Rolph's Hall on February 17 last, which filled the meeting place to overflowing. Drs. Rucker and Converse spoke at this meeting and also Mr. A. W. Scott, of your Committee, and Messrs. Lent and Boardman, of the Real Estate Board.

Feeling that our regular meeting place could not accommodate the numbers who were anxious to hear about the measures necessary to prevent the spread of disease, we held a mass meeting on the 27th ultimo in the Sixteenth-Street Theatre, Sixteenth and Capp Streets. To this mass-meeting all the citizens of the southern portion of the City were invited and many attended from the most southern parts of the City. At this mass-meeting circulars were distributed, which were to be returned to the Association with the amount subscribed to the cause designated on them. The Association is still very active in bringing all abuses to the attention of the proper authorities and in seeing that the people of the Mission do their duty in the health crusade.

All abuses noted within the district bounded by Ninth Street on the north, the County line on the south, Potrero Avenue on the east, and

Twin Peaks on the west, which are the boundary lines of our Association, have been reported by our Committee to the health officer of the respective district.

Assuring you of our active coöperation in this matter, we beg to remain

Very truly yours,

THE MISSION PROMOTION ASSOCIATION,

F. J. CHURCHILL,

Secretary.

The Sub-Committee from the Retail Druggists, E. L. Baldwin, chairman, took effective action to reach every drug store, and the customers of every drug store, in the City. It sent out a poster, reproduced in the appendix, to be displayed in stores. With the poster went a letter to the members of the retail drug trade, and one to the Chief of Police. The first read as follows:

SAN FRANCISCO, CAL., February 14, 1908.

The circular note enclosed with this is self-explanatory. We will add, however, that conditions are far more serious than people realize. At the meeting referred to we were confronted with the facts and figures, sufficient to make any citizen sit up and take notice.

You are earnestly requested to make a display of poisons and post this notice in your window, on or before the 17th of the month, and keep it there until conditions are far better than they are now.

We are coöperating with the health authorities in this work and will request the Police Department to have the patrolmen notify us of any drug store that has been overlooked in sending out these circulars.

Please distribute the printed matter to your customers, which we will send you later.

Please urge your customers with all seriousness to assist in this work and try to get them to interest others, and thereby save your business from the calamity of a quarantine, which is almost in sight and will become a certainty if people fail to heed the warning.

Fraternally,

E. L. BALDWIN, C. A. FULLER,

F. T. GREEN, J. H. BOYSON,

W. B. CHEATHAM, *Secretary,*

Druggists' Committee.

The druggists' letter to the Chief of Police read:

DEAR SIR: Enclosed please find copies of printed matter and copy of personal letter we have sent to all druggists.

May we have your coöperation, along the lines indicated in the letter to druggists?

If the patrolmen will notify us of any druggist who has not posted these notices and made a display of rat poison, we will see that a committee calls upon him to insist upon it being done.

Kindly acknowledge receipt and advise us whether we may expect the assistance of your Department in this work, and oblige

Yours very respectfully,

E. L. BALDWIN, C. A. FULLER,
F. T. GREEN, J. H. BOYSON,
W. B. CHEATHAM, *Secretary.*

So the work went on, simultaneously, in the fields peculiar to the different Sub-Committees, and reports came in from the Milk Dealers' Association, the Master Painters and Decorators, the Retail Hardware Dealers Association, the Merchants' Exchange and grain dealers, the Pacific Coast Master Bakers Association, and many more.

CHAPTER XXVI.

ORGANIZED LABOR.

Union labor in San Francisco comprises three large organizations: the Labor Council, the Building Trades Council, and the City Front Federation. Sub-committees were appointed from these three bodies. Through them it was possible to reach a large proportion of the working men of San Francisco. Organized labor in general was represented on the Executive Committee by Walter Macarthur, editor of the Coast Seamen's Journal. In February Mr. Macarthur enlisted the co-operation of the Labor Council, which ordered that the cards and circulars sent it by the Executive Committee should be distributed amongst the different unions. The secretary of the Council was instructed to send a special letter to the affiliated unions requesting them to assist. The unions were partly prepared for this call by a circular letter sent out from Council headquarters on October 31, 1907, stating that cases of plague had been traced to rats and asking everybody to lend a hand and help exterminate the pests.

The Labor Council's sub-committee, consisting of Andrew J. Gallagher, Timothy A. Reardon and E. H. Misner agreed to visit the different union headquarters and arrange for meetings. Business agents took up the work of disseminating information and every union man was urged to volunteer his services. The Labor Council reported, ultimately, in part as follows:

SAN FRANCISCO, November 9, 1908.

MR. L. M. KING, *Secretary Citizens' Health Committee,*
1233 Merchants' Exchange Building, City.

DEAR SIR: Permit me to report that this Council received a communication from your Committee asking its coöperation early in the

proceedings of your Committee. A sub-committee of eight was appointed to investigate and the said Committee recommended to the Council that it extend to the Citizens' Health Committee every possible aid and assist in their work.

This Sub-Committee was provided with authority to visit all of the local unions affiliated with this Council, calling attention to the necessity of cleanliness as a preventive of the dread plague; also admonishing them to assist in their different households in eradicating rats and vermin.

The Sub-Committee from time to time reported to this Council that they were visiting the different workshops, factories, etc., in which members of our unions were employed; also were reporting to your Committee the more dangerous places visited.

We feel that the work of our Committee under instructions from the Council was productive of great good, in so far as butcher shops, restaurants and saloons were concerned. We were able to receive confidential information about these places from members of our unions employed therein, which information could not be conveyed to your general Committee because of the danger of loss of employment to the person reporting same.

We are pleased to have been of service in this regard and take this opportunity of congratulating your Committee upon the efficient manner in which the work of cleansing the City and removing the fear in the minds of its citizens was accomplished.

Hoping that this will be satisfactory, I remain

Respectfully yours,

ANDREW J. GALLAGHER,
per JOHN I. NOLAN,
Acting Secretary of San Francisco Labor Council.

The Building Trades Council and the City Front Federation assisted in a similar manner.

Chapter XXVII.

The Clergy's Part.

Rat destruction, cleanliness and sanitary doctrine in general were preached in the churches and Sabbath Schools of San Francisco for several months after the campaign began. A general meeting of the clergy of all denominations was called early in February in the rooms of the Chamber of Commerce and appointed a Sub-Committee to advance the sanitary crusade.

Rabbi Voorsanger suggested that mass meetings be called frequently in all churches and that superintendents of Sabbath schools take at least five minutes every Sabbath to instruct the children in the necessity of neatness about the house and yard in order that the rats might not find food. Dr. Voorsanger also proposed that every clergyman devote at least one Sabbath a month to the subject.

At this meeting the Rev. Father O'Ryan, representing the Archbishop, announced that a letter of instruction had been sent to every Catholic church in the diocese, directing the pastors to discuss health conditions with their congregations, and that the notice was to be read in the Catholic churches Sunday.

The Sub-Committee of the clergy began by issuing the following letter:

San Francisco, Feb. 17, 1908.

To the Clergy of San Francisco:—

The undersigned Committee, appointed at the meeting of clergymen held last Friday, February 14th, at the Merchants Exchange, met this morning at the First Congregational Church and unanimously agreed to recommend the following:

1st: That every minister of a congregation, according to his own judgment, present from his pulpit to his people the necessity of continuing effort in promoting the sanitation of San Francisco by careful examination of their own premises and by recommending the same thing to their neighbors;

2nd: That a recommendation be made to the superintendents of Sabbath Schools by their pastors to incorporate a short talk on sanitation in their addresses to the Sunday School assemblies;

3rd: That, as far as practicable, mass meetings be organized in the various churches for the purpose of presenting public discussions on the subject of sanitation in general and the issue now before the people in particular;

4th: That recommendations be made to the Committee in charge of the houses of worship to subject the latter to a thorough cleansing and to continue that process until all danger of infection be removed from the City.

GEORGE C. ADAMS,
First Congregational Church.
JACOB VOORSANGER,
Temple Emanu El.
FREDERICK W. CLAMPETT,
Trinity Church.
PHILIP O'RYAN,
St. Mary's Cathedral.
H. H. BELL,
First United Presbyterian Church.

Dr. Rucker gave this advice on keeping churches in sanitary condition and free from fleas:

"All carpets in churches, theaters and auditoriums should be taken up, thoroughly beaten and sunned. Then the floors should be thoroughly swept and the sweepings burned. Next, the floors should be scrubbed with lye. And finally the floors should be treated with a solution of crude carbolic acid, one part to four of coal oil. This will kill the flea and destroy flea eggs. Cushions should be taken out, beaten and sunned. Compressed air cleaning is effective in destroying fleas."

Making a Plague-Proof City

Public-spirited citizens destroying their rat-infested warehouses, which were replaced with rat-proof buildings of armored concrete.

CHAPTER XXVIII.

THE JAPANESE IN SAN FRANCISCO.

The Japanese of San Francisco early expressed a desire to co-operate and the Japanese papers published translations of the Committee's literature.

Mr. Taro Hodsumi of the Yokohama Specie Bank, Chozo Koike, Japanese Consul General at that time, and D. S. Richardson, Foreign Secretary of the Japanese Consulate, were active in organizing the campaign among the Japanese. As soon as the work was well under way the Consul General made the following report:

SAN FRANCISCO, CAL., Feb. 29, 1908.

MR. LEON SLOSS, *Chairman Finance Committee of the Citizens' Health Committee of San Francisco.*

DEAR SIR:—Acknowledging receipt of your favor of the 25th inst., relative to sanitary conditions at present prevailing in San Francisco, and outlining the general plans of the Citizens' Health Committee with regard to raising funds, etc., I beg to say that you are quite correct in assuming that the Japanese of this community have a deep interest in the matter.

Acting upon your suggestion I beg to say that, under date of yesterday, I caused a special meeting to be called of the Japanese Association of this City, at which the following committee was appointed with instructions to put itself in communication with your central body:

Mr. T. Hodsumi, Agent of the Yokohama Specie Bank,

Dr. K. Kurosawa, 2008 Pine Street,

Mr. J. Koike, Merchant, 1172 Sutter St.,

Mr. K. Abiko, Pres. Japanese Industrial Corporation,

Mr. M. Tsukamoto, Merchant, 3500 Twenty-third St.

I would respectfully suggest that any communication desired by you with this Committee, may be had through Mr. Hodsumi.

In this connection, I beg to report further that, with a view to supplementing the work now being done by the health authorities of this City a committee consisting of one member of the Japanese Associa-

tion, one Japanese physician and one member of the Consular staff, is at present engaged in making a house-to-house inspection of all Japanese residences and business houses, advising and instructing the people as to the proper methods of observing sanitary conditions, the destruction of rats, etc.

With the assurance of my earnest desire to co-operate with your Committee in the necessary work which it is doing—which desire is shared by my countrymen generally—I beg to remain,

Yours respectfully,

(Signed) CHOZO KOIKE,
Consul General of Japan.

The final accounting of work done by the Japanese Association was as follows:

SAN FRANCISCO, Nov. 16, 1908.

MR. L. M. KING, *Secretary Citizens' Health Committee, San Francisco, Cal.*

DEAR SIR:—In answering your favor of October 29th, concerning the part taken and the methods pursued by this Association in the recent sanitation campaign for the eradication of plague in San Francisco, we have the honor of making the following statements:

At a meeting of the Directors, held February 18, 1908, a resolution was adopted to the effect that this Association, through its Executive Officers, offer to the Citizen's Health Committee every assistance within its power to further the work in which your Committee was then engaged.

In this way our Association was brought in touch with the plans of the Citizens' Health Committee, and from this time we were guided, to a very large extent, by the methods employed by your Committee.

Our first procedure was the translation of all notices and placards, such as were being circulated throughout the City by your Committee. In this translation our aim was to choose only those parts which applied particularly to the conditions of the Japanese residents of this City. The parts translated were printed in large type on thick, durable cardboard, with a convenient device for hanging on the wall, and distributed to each and every house in San Francisco. They read as follows:

NOTICE.

CLEANLINESS IS THE JAPANESE NATURE.

The Board of Health, and all Citizens of this City are undertaking to kill the rats and destroy the pest disease, and we call upon all the

Japanese, living in this City, to keep themselves and their places of abode in a state of cleanliness, and thereby assist in keeping this City safe and free from pestilence.

Isn't this our duty and our honor?

Directions for the care of the bedroom, kitchen, porch, garbage can, etc.

1.—Kill all the rats.

2.—Use the large size traps to kill the rats, and heat the traps before using the second time.

3.—Place all your food material where the rats cannot touch it.

4.—Do not put your vegetables upon the floor of your house or upon the ground.

5.—Do not put the meat, fish, bones, egg shells, and such, in the garbage can. It is better to burn them in the stove.

a.—If you do not use the stove for the burning of the garbage, you must put it in the metal garbage can and keep the cover closed tightly.

6.—Let the ash man clean your garbage can twice a week.

7.—Let the garbage man empty your can in his wagon on the street. If he does not do so, inform the nearest policeman.

8.—Do not strew your dirt on the streets or in your back yard.

9.—Do not kill the rats with your hands.

10.—Fleas are carriers of the pest, so don't use your fingers or teeth to kill fleas; burn them in the fire.

11.—Do not sleep in rooms unless containing at least five hundred cubic feet for each person.

12.—Do not reject orders given by officers of the Board of Health.

13.—If, after receiving orders from proper officials, these orders are not obeyed inside of forty-eight hours, you are liable to arrest and fine of from $25 to $50.

We then sent a committee consisting of the following members: Taro Hodsumi, Z. Koike, K. Abiko, Dr. K. Kurozawa, and M. Tsukamoto, to attend the meeting and confer with your Committee.

At the same time a campaign was started among the Japanese community, for the purpose of raising funds.

The success of this part of the work is shown by the fact that we raised and turned over to your Committee the sum of $1245.50, on April 4th, and $374 on April 30th, making a total of $1619.50.

The most important part of the work undertaken was the inspection of the Japanese dwelling places. This work was placed in the hands of a special committee of three, consisting of one from the Japanese Consulate, one from the Japanese Physician's Association, and one from our Association. The field covered by this committee comprised the following districts:

From Sacramento Street south to Golden Gate Avenue, and from Larkin Street west to Devisadero Street.

Stockton, Dupont, and Kearny Streets.

Third Street, and South Park.

In inspecting these places the particular attention of the occupants was called to the imperative need of strictly observing the regulations of the Health Committee.

The first canvass by this special committee was made in the early part of March.

The second canvass, beginning early in April, was made concentrating the work upon those places where, in our opinion, the outside pressure was most necessary.

Hoping that the part we have taken in this work has proved in some measure a help to you, we beg to remain,

Yours most truly,

Japanese Association of America,

Per T. Kuma, *Secretary.*

Chapter XXIX.

Improvement Club Work.

Typical of the work in the improvement clubs were the operations of the Devisadero Street Improvement Association. This organization took charge of 80 blocks, dividing them into four sections. Messrs. William Crocker, Adolph Meyer, and William F. Smith, and Dr. R. L. Rigdon each took a section to supervise, and these gentlemen gave a large part of each day for several weeks to making house-to-house inspections and persuading the residents of a district that always supposed itself clean, really to clean up and stay so. Toward the end of February William Crocker, the president of the Association reported:

"We are glad to state that in a majority of cases the tenants and owners are cleaning up thoroughly and we hope inside of 30 days to have the whole 80 blocks in a perfectly sanitary condition."

A special sanitary association was organized for Presidio Heights, under the chairmanship of Milton H. Esberg. Its sanguinary purpose was to "put the district in perfect sanitary condition and kill every rat in the neighborhood."

One of the most active was the Fillmore Street Improvement Association. This organization hired two special inspectors and conducted its part of the campaign in a highly effective manner. The Haight and Ashbury Improvement Club was especially effective. The Visitacion Valley Improvement Club hired two houses, which it placed at the disposal of the sanitary corps for sub-headquarters.

Some fifty-four improvement clubs in various parts of the City were induced to take part actively. Most of these were

federated in the form of the Civic League, of which organization special mention should be made. It organized a volunteer inspection service, appointed committees in every district to canvass their neighborhoods thoroughly, and gave valuable assistance in general.

Chief of Police Biggy and several of his captains appeared before the Committee on different occasions and promised their support to the movement. Meetings of companies were held at all police stations and thorough instructions were given on the requirements of the case. A card of special instructions was issued, the contents of which will be found in the appendix. Two officers were detailed to each provisional plague district headquarters, where their services were very effective. For reasons that will appear later the patrolmen were relatively ineffective as sanitary inspectors, but their services in spreading a knowledge of anti-plague measures among the people, and in creating proper sentiment in regard to cleanliness, were very valuable.

CHAPTER XXX.

THE WORK OF SAN FRANCISCO'S WOMEN.

It is the opinion of the sanitary officials that no such undertaking could ever be as successful again without the help this community received from its women. They woke up the School Department and had the school buildings specially scrubbed and cleaned during the Easter vacation. They interviewed the hotel men and inspected the hotel kitchens. Their organization reported a vast number of vacant lot nuisances that the authorities abated. They were more effective than men could have been in the investigation of candy stores and candy factories, some of which were conducted in temporary shacks and in a dangerous fashion. They inspected the jails and the restaurants, the street cars and lodging houses and they made the authorities and the owners clean up. They were indefatigable visitors and inspectors, and reporters of nuisances of every description. In one or two cases they even inspected stables.

They appealed to the members of the Waitresses' Union to consider themselves committees of one to watch conditions where they worked and keep them up to the proper standard. They called mothers' meetings and preached sanitation to housewives all over the town.

In one instance a "penny arcade" was about to be built over the former site of an old hay barn. The place had never been cleaned up and was one great rat-nest. The matter was reported by a member of one of the women's clubs and an extremely dangerous nuisance was abolished in consequence.

It is not too much to say that the garbage methods of half the kitchens in San Francisco were reformed through the gen-

Where Contagions Might Breed

This is the kind of place in which the unfortunate rag-sorters do their work and run the constant risk of contracting tuberculosis and other ailments. The woollen rags may go to the shoddy mills. The white cotton rags may be used in the manufacture of roofing paper, or as wiping rags instead of waste. The sterilized rag is the only safe rag to use. Unsterilized rags are a constant menace to the individual handling them and to the community at large.

eral educational campaign conducted by the women, who were about the only persons in the community that could do anything to change the practices of domestic servants. No nuisance was too small or too large to escape their attention, from the throwing of orange peels on the sidewalk where rats could get them, to the five foot garbage heap at the Ingleside jail.

Among the details of their work were the placing of placards in new buildings under construction asking workmen to be careful about the disposal of food scraps, checking up the work of the school janitors and inducing the Board of Education to fumigate most of the school buildings; compelling fruit, vegetable and fish peddlers in the residence districts to stop throwing scraps and trimmings in the streets; having garbage cans placed in the park and along the beach for picnickers; an effort to have the ordinance enforced against throwing house sweepings into the street; inspecting and reporting on apartment-house refuse; securing a woman inspector for the schools of the Telegraph Hill district.

The movement among the women was started by the Citizens' Health Committee through the California Club. Mrs. J. W. Orr, president of the latter organization, appointed a committee consisting of the following ladies: Mrs. A. W. Scott, chairman; Mrs. Aylett R. Cotton, Mrs. A. P. Woodward, Mrs. A. D. Bowen, Mrs. J. G. Walker, Mrs. Sidney S. Palmer, Mme. Emilia Tojetti, Mrs. Charles H. Ward, secretary, Mrs. J. W. Orr, ex officio.

A mass meeting of all the women's clubs in the City was called, at which 60 organizations and 45 churches were represented. A central committee was formed, representing the various organizations, as follows:

Forward Movement, Miss M. D. Sheehan.

Telegraph Hill Neighborhood Association, Miss Elizabeth Ash.

Potrero Settlement Association, Miss Octavia Briggs.
Local Council, Mrs. F. Malloye.
Pioneer Women, Mrs. Charles Carroll.
Glen Ellen Club, Miss O'Donnel.
Women's Auxiliary California Pioneers, Mrs. A. Rosenthal, Mrs. Rose Steinhart, Miss Hannah Lezinsky, Mrs. J. J. Brice.
South Park Mothers, Mrs. J. Robinson.
Emanu El Sisterhood, Mrs. M. Esberg, president.
Sketch Club, Mrs. Ernest Simpson.
Colonial Dames, Mrs. S. Wright.
San Francisco Sewing Club, Mrs. Andrew Welch.
Junior Outdoor League, Miss Susette Newton.
Young Women's Christian Association, Mrs. G. H. Thurston.
Mothers' Club of Boys' Club, Mrs. J. Halpin.
Ladies' Sierra, Mrs. L. H. Eaton.
Women's Aid, Miss Laura McKinstry.
Children's Hospital, Mrs. L. L. Dunbar.
Native Daughters, Mrs. Emma J. O'Donnell.
Visitacion Valley Improvement Club, Mrs. R. B. Hutchinson.
Thursday Night, Mrs. G. S. Burnett.
Clionian, Mrs. John H. Robertson.
Susan B. Anthony Club, Mrs. Louis Anderson, Mrs. Charles H. Bline.
Suffragist League, Mrs. Horace Coffin.
Monroe Improvement Club, Mrs. D. F. Pafalls.
Sorosis Club, Mrs. John Loosley, Mrs. E. B. Young.
San Francisco Sociological, Miss Fairbrother.
Laurel Hall, Miss Christine Hart.
Moore, Mrs. Helen Moore.
Forum, Mrs. H. H. Mayhew.
Century, Mrs. Austin Sperry, Mrs. John Merritt.
Daughters of Pioneers of California, Mrs. E. F. Macgregor.

Corona, Mrs. J. H. Bullock.
Philomath, Mrs. I. Lowenberg.
Council of Jewish Women, Mrs. Levy.
To Kalon, Mrs. F. W. Thompson.
Papyrus, Mrs. E. M. Cooper.
Cap and Bells, Mrs. Squire V. Mooney.
Civic Betterment League, Miss Chase.
Jefferson Davis Daughters of California, Mrs. Holje.
Town and Country Club, Miss Jeanette Von Schroeder.
Francisca Club, Mrs. Oscar Cooper.
Maternity Hospital, Mrs. James A. Cooper.
Channing Auxiliary, Spinners, Mrs. Ernest Simpson.
Press Association, Mrs. W. C. Morrow.
Sequoia, Mrs. L. M. Sexton.
Franklin Square Mothers, Miss Florence Músto.
Neighborhood Club, Mrs. Parnell.
Occidental Kindergarten, Mrs. Armer.
Thursday Afternoon Club of the Mission, Mrs. E. R. Ebner.
Infant Shelter, Mrs. M. S. Cooper.
Nursery for Homeless Children, Miss Adelaide Pollock.
Women's Exchange, Mrs. E. B. Breyfogle.
Associated Charities, Miss Katherine Felton.
Potrero Improvement Club, Mrs. Cudworth.
Point Lobos Improvement Club, Miss M. G. Barrett.
Browning Club, Mrs. George Oulton.
Society of the First, Mrs. J. B. Chown.

CHURCHES.

Catholic Aid Society, Mrs. Margaret Dean.
St. Luke's Church, Mrs. Florence Ferguson.
Women's Auxiliary to Episcopal Board of Missions, Mrs. L. F. Monteagle.
First Presbyterian, Mrs. L. A. Kelly.

Central Methodist, Mrs. Rolla V. Watt.
Society of Christian Workers, First Unitarian, Mrs. M. A. Lawton.
Jewish, Mrs. J. C. Levy.
Presbyterian and Congregational, Mrs. F. A. Thompson.
Young Ladies' Institute, Miss J. T. Malloy.
Calvary Presbyterian, Mrs. H. B. Pinney.
Methodist, Mrs. L. S. Anderson.
Baptist, Mrs. Cadwalader.
First Unitarian, Mrs. A. L. Halliday.
First Congregational, Mrs. John F. Merrill.
Second Unitarian, Mrs. Calvert Smoot.
St. Anthony Guild, Mrs. J. J. O'Brien.
Catholic, Mrs. Woodward.
Trinity, Mrs. H. A. Seager.
Westminster, Mrs. Nellie Putnam.
Holly Park, Mrs. Mattie Creswell.
St. Paul's, Mrs. James G. Decatur.
St. James', Mrs. J. C. Sexton.
South Avenue, Mrs. L. M. O'Neal.
Memorial, Mrs. J. T. Gardener.
Howard, Mrs. R. Cadwallader.
St. John's, Mrs. Frank Fredericks.
Mizpah, Mrs. Frederick Doane.
Grace M. E. Church, Mrs. George A. Hough.
Howard M. E. Church, Mrs. A. C. Bane.
Wesley M. E. Church, Mrs. C. B. Perkins.
Trinity M. E. Church, Mrs. Carl Warner.
Ashbury M. E. Church, Mrs. F. M. Channing.
First M. E. Church, Mrs. H. E. Fish.
Hamilton M. E. Church, Mrs. F. G. Husky.
California Street M. E. Church, Mrs. E. E. Johnston.
Epworth M. E. Church, Mrs. E. G. Keith.

The work was laid out by sections to correspond with the Federal sanitary organization, and committees were assigned to work in the thirteen districts as follows:

Districts 1 and 3, east of Taylor and north of Market Streets; Mrs. J. F. Merrill, chairman, assisted by Mrs. E. B. Young, Mrs. Ernest Simpson and Mrs. George Adams.

District 2, east of Octavia and north of Pacific; Mrs. Charles H. Ward, chairman, assisted by Mrs. B. C. Rockwell, and Miss M. F. Fusier.

District 4, east of Octavia and north of Market; Mrs. A. W. Cornwall, chairman, assisted by Mrs. Laura B. Powers.

District 5, west of Octavia and north of Sutter; Mrs. F. W. Thompson.

District 6, south of Sutter and north of Market; Mrs. California Newton, chairman, assisted by Mrs. W. R. Parnell, Mrs. W. J. Grey, and Mrs. J. E. Bermingham.

District 7, Richmond; Mrs. Frank Fredericks.

District 8, Sunset; Mrs. J. C. Levy.

District 9, south of Market and west of Mission; Mrs. Helen Moore.

District 10, south of Islais Creek; Mrs. L. A. Kelly.

District 11, south of Eighteenth and Islais Creek and east of Mission; Miss Ethel Beaver, chairman, assisted by Miss Eugenia Schenk.

Districts 12 and Sub. 12, south of Market east of Seventh and south of Market west of Seventh; Mrs. Horace Coffin, chairman, assisted by Mrs. Austin Sperry.

Other committees were also appointed to cover particular sections. These were:

Golden Gate Park District, Miss Susette Newton, chairman, assisted by the Junior Outdoor Art League.

Telegraph Hill District, Miss Elizabeth Ash.

Glen Park District, Mrs. Theodore Pinthar.

Point Lobos District, Miss Margaret G. Barrett, assisted by the Point Lobos Improvement Club.

Schools, Miss Alice Griffith.

An advisory committee was appointed, consisting of the following ladies: Mrs. Louis Hertz, Mrs. Davis Louderback, Mrs. F. M. Malloye, Mrs. E. L. Baldwin, Mrs. Henry Payot, Miss Elizabeth Ashe, Miss Mary Fairbrother, Mrs. L. A. Howard, Mrs. R. I. Whelan, Mrs. H. H. Mayhew, Mrs. A. V. Brown, Mrs. Ernest Simpson, Miss Ida Kervan.

Mrs. Charles H. Ward was the first secretary and was succeeded in that office by Mrs. William H. Nicholl.

The organization was known as the Women's Sanitation Committee, and as long as the Citizens' Health Committee has been in the field it has operated as a regular sub-committee of that body; but it has been determined that the work shall be continued after the Citizens' Health Committee disbands, and the organization has been made permanent under the name of the "Women's Public Health Association of California." The Committee feels that not the least valuable of its achievements has been the bringing of this association into existence.

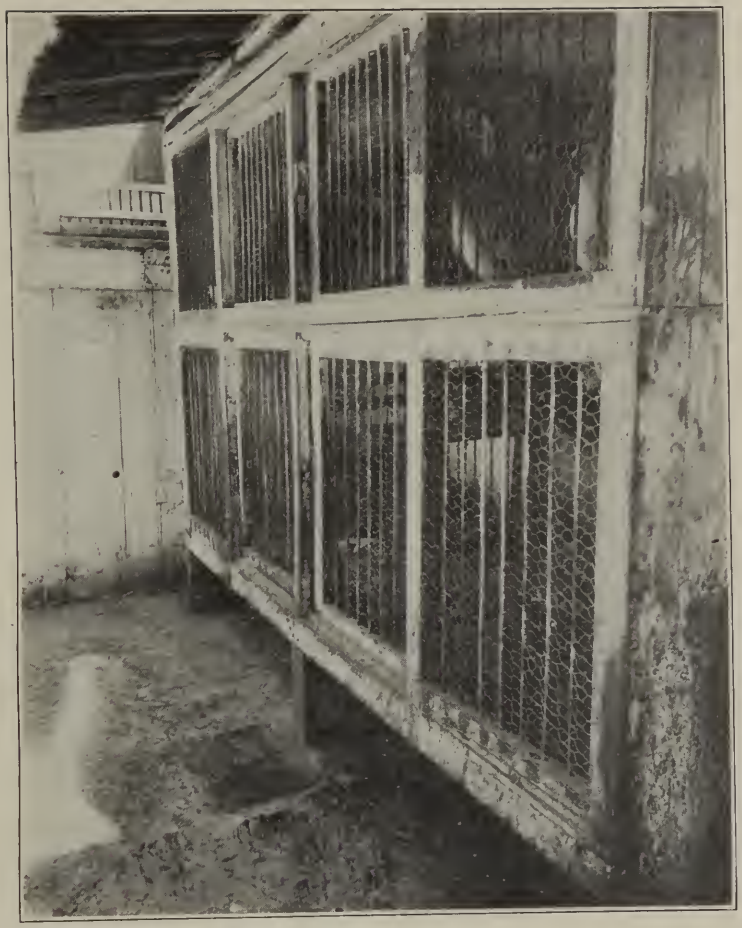
CHAPTER XXXI.

THE PUBLIC SCHOOLS.

San Francisco's public schools, numbering about eighty-six buildings, in which 40,690 children receive instruction, were treated, from a sanitary standpoint, in two different ways: First, they were used as means of spreading the anti-rat propaganda among the people; and second, they were attacked directly as a sanitary problem in themselves.

The condition of the schools was made the subject of a special examination by a committee of the Women's Sanitation Committee, of which Miss Alice Griffith was chairman. Many of the older ones were found to contain bad plumbing, primitive toilet arrangements, and their wooden planked yards and sub-floor spaces were good rat harbors. They presented, in short, all phases of hospitality to rats to be found in large public buildings, including the open garbage can at which lunch refuse was thrown. In respect to plumbing, some of the temporary shacks erected after the fire were found to be better off than the old, permanent structures. The school property was also examined carefully by a Federal inspector, and by dint of suitable recommendations from both sources, many very dangerous nuisances were abated.

Following its object, the Citizens' Health Committee determined to extend its plague propaganda through the schools to the people and appointed Dr. Harry M. Sherman a special committee to take up this phase of the work. By the middle of March he had arranged for forty-seven meetings in as many different buildings, and had secured the services of physicians to address them all. The lectures were well attended by the



IF YOU MUST KEEP CHICKENS

Sanitary chicken coop. Note the concrete flooring, elevation above the surface of the ground to allow free access to the natural enemies of the rat, screening and whitewash. Thousands of insanitary chicken coops were abolished and those remaining put in perfect sanitary condition.

parents, and the pupils evinced a lively interest in what they were told.

By early April Dr. Sherman reported that "all of the public schools of San Francisco, including the night schools, a total of eighty-eight, have had addresses made in them to the children, and if possible to the parents of the children, regarding the plague. In addition the private and parochial schools have also been addressed."

The volunteer staff of physician lecturers that gave their time and energy to this work at the call of the Committee included the following gentlemen: Drs. H. E. Alderson, G. E. Ebright, A. W. Hewlett, H. Brunn, R. Bine, S. Blum, A. J. Lartigau, C. Quinan, J. C. Spencer, W. G. Moore, R. Russ, J. D. Arnold, P. K. Brown, R. L. Ash, H. B. Kugeler, J. L. Whitney, T. G. Russell, D. W. Montgomery, A. A. O'Neill, G. J. McChesney, and H. P. Hill.

A syllabus of their schoolroom lectures reads in part:

> Two very strange facts are established: First, this disease is really a disease of rats; second, it spreads from the rat to man by the rat flea (a special kind of flea) biting first a sick rat and then a man and so carrying the germ of the disease from the rat to the man. There are some other ways of the disease spreading, but this is the most common way and the only one that requires our attention now.
>
> If there were no rats in San Francisco there could be no rat fleas.
>
> If all the people in San Francisco were careful and cleanly in their ways of living, there could be no rats. Then this disease could not come among us.
>
> The disease is here because the rat and his flea are here, and the rat is here because ALL of the people of San Francisco are not careful and cleanly in their ways of living.
>
> The rat is a natural scavenger. He lives on what man throws away. He lives best where much food and scraps and garbage are thrown about. In the City this is his chief supply of food. If the people of San Francisco will throw no food scraps away, but either burn them or put them away in places where rats can not get them, the rats will leave that place to seek food elsewhere, or will take the poisoned food prepared for them.

The personal value of this is that one diseased rat in a backyard or cellar or in the walls of the house means that any or all of the people living there may have the disease.

If man is ill of this disease he has only half a chance to get well; more than half of those ill of it in San Francisco have died.

The rats from a neighboring house may be dangerous to man. Therefore, uncleanly neighbors are dangerous; their dirty habits may directly endanger one's life. To protect life one must watch one's neighbors and report them if they are uncleanly. This may be a way of saving one's own life and the dirty neighbor's life, and is, therefore, a proper thing to do.

Report ALL infractions of sanitary laws to the same place. Do this in writing or in person. Do not telephone.

To keep this rat disease from spreading among us we must drive away the rat,

1. By being clean. See kitchen rules.
2. By catching and killing the rat, using traps and poison.

A reward of five cents will be paid for every rat, dead or alive, delivered at any of the stations of the Health Department between the hours of 8 and 10 a.m.

They must be delivered to the stations in tightly covered cans, labeled so as to show in what neighborhood they have been caught.

Caution! Do not touch with the hands, but use tongs or a long stick. Traps should be picked up with cloth saturated with kerosene. Drop rats immediately into kerosene, or, in the absence of this, into a bucket of water, where they should remain for an hour, after which they may be placed in the cans for delivery.

Thirty-five thousand copies of the "kitchen cards" containing rules for getting rid of rats, to be hung up in kitchens, were published and issued to the lecturers by the Committee and taken by the children to their homes. The contents of this card is printed in the appendix.

CHAPTER XXXII.

MAIN POINTS OF ATTACK.

It was early recognized that besides the peculiar conditions existing in San Francisco in consequence of earthquake and fire, the normal life of the City presented certain weak spots in the face of a plague epidemic through the production of accessible rat food and the maintenace of rat harbors, and that vigorous attacks must be directed at these points. Among the more important ones were, first, the scavenger service and garbage disposal; second, the water front; third, Butchertown; fourth, the retail butchers and produce dealers, with the markets, restaurants, delicatessen stores, and other purveyors of food; fifth, the wholesale produce and commission merchants; sixth, the warehouses; seventh, the stables and the disposal of manure from them; eighth, and one of the most dangerous of all, private chicken yards; ninth, what was probably the most serious general menace, yard, alley, and basement floor planking wherever found, and, tenth, the sewers. One by one these danger points had to be attacked and conquered.

In addition, scrap metal in the burned district was, on every lot, pitchforked together and elevated on supports about a foot high; and regulations were issued requiring the piling of lumber clear of the ground. The rag industry was put on a certification basis.

CHAPTER XXXIII.

GARBAGE.

Garbage destruction in San Francisco was a private monopoly and the incinerator company charged the scavengers according to the quantity destroyed. The scavengers, in turn, charged the householder, or tried to. At times, some of the scavengers raised their rates arbitrarily and disputes with housewives stopped collections.

The arrangement formed a constant temptation for the garbage-man to get rid of the refuse without taking it to the incinerator, and for the householder to dispose of it without recourse to the garbage-man. Which ever yielded fed rats. By virtue of this process vacant lots and back alleys became boarding houses for the pests.

In February the Committee bought three thousand garbage cans from the old crematory in Oakland, and arranged with the Associated Charities to have them distributed to people that were too poor to supply themselves. Others were urged to get garbage cans, with tight lids, and to see that they were emptied twice a week and the lids kept on between times so that no rat could get food from them. An ordinance was passed making the use of such receptacles compulsory.

As a result of the general agitation it has been estimated that at least one hundred thousand new garbage cans were put into service in San Francisco during the year.

The householders having been converted to the use of good cans, the next thing was to put pressure on the scavengers to improve the collection. The Committee took up the matter with Mr. Belgrano, honorary president of the Scavengers' Pro-

tective Association. It was agreed that a scavenger should be sent to every place reported by Dr. Blue's inspectors to be without service, and if the tenant of the premises refused to hire him the case was to be reported to the Board of Health, which would use coercion. It was also decided that Mr. Belgrano should report all cases where a scavenger had removed garbage for a month to determine the proper price and the tenant had then refused to employ him, and the Citizens' Health Committee agreed to be responsible, up to one hundred dollars, for the payment for services rendered in this manner.

A meeting of several hundred scavengers was held in Garibaldi Hall. They were warned against overcharging, told they must cease carrying garbage to the wagons in gunny sacks or tarpaulins, a practice that left trails of rat food, and given ten days to have their wagons lined with metal to prevent the dripping of swill along the streets. They were warned that bad behavior in these particulars would be followed by a revocation of licenses.

The Board of Health required the re-licensing of all scavengers, and made it compulsory for all wagons to bear large, legible numbers.

The Supervisors passed a suitable ordinance, which will be found in the appendix, and also passed one requiring building contractors to furnish proper garbage cans for their workmen to use.

On February 13th, the Committee addressed this communication to the Supervisors:

TO THE HONORABLE BOARD OF SUPERVISORS, *City and County of San Francisco.*

GENTLEMEN:—This is to certify that the following preamble and resolutions were adopted at a meeting of the Executive Committee of the Citizens' Health Committee held this 13th day of February, 1908.

Whereas, the methods in force of collecting and disposing of the refuse and garbage of the City and County of San Francisco are in-

sanitary and not in accord with modern scientific and economical methods, and

Whereas, the present methods must always continue to be a menace to the general health condition of the City, as well as the health of every individual in the City; therefore be it

Resolved, that the best interests of the City and County of San Francisco demand that the municipality assume the entire control of the collection and disposal of all refuse and garbage within the corporate limits of the City and County, and

Whereas, it has been estimated by competent engineers that, in order to dispose effectively of the City's garbage, the sum of One Million Dollars ($1,000,000) will be required for the acquisition of the necessary land and the construction of the necessary incinerators and accessories, be it further

Resolved, that the Supervisors of the City and County of San Francisco, in order to carry into effect the public utility as set forth in the foregoing resolutions, provide for the same in the proposed bond issue by an allotment of One Million Dollars ($1,000,000) for the specific purpose of refuse and garbage destruction.

CITIZENS' HEALTH COMMITTEE,
(Signed) L. M. KING, *Secretary.*

At the bond election that took place in May this item was adopted by the people of San Francisco and negotiations are now under way looking to the absorption of the interests of the old garbage monopoly.

As a vital sanitary matter the collection of garbage should be under the direct administration of the Board of Health. No other department is likely to appreciate the importance of having it well done all the time.

CHAPTER XXXIV.

THE WATER FRONT.

Plague lands at a city's water front and takes departure from it. San Francisco's "front" is about nine miles long, and most of it is rat-riddled, though probably it is no worse than the same section of all seaports. Bad features were, the throwing of food scraps from vessels, the fact that sewage empties into the bay and blows back under the open wharves when the wind is right, and a general carelessness about the handling of freights, especially grain and other food-stuffs—and, in general, the common tolerance of the rat as a necessary evil.

Early in March Harbor Commissioners Stafford and Dennison met with the Executive Committee, and agreed to order daily inspection of the entire wharfage, and also to have their employees go under the open wharves and place poison.

A special committee consisting of E. H. Rixford and Dr. Langley Porter was detailed to investigate this danger zone, and soon reported improvement at certain points, such as the vicinity of the outfall of Clay street sewer and the space beneath the grain sheds at Clay Street wharf, a sandy beach formerly badly rat infested. The concrete bulkhead at Clay Street was cited as a rat proof structure and a model of what the entire water front should be, but that portion south of the Ferry building, to Beale Street, was found in very bad condition.

Mr. Scott of the Executive Committee, negotiated an arrangement whereby the City, the Harbor Commission, and abutting property owners agreed to share the expense of dredging "Channel Street," an open slough into which sewage

SANITARY REQUIREMENTS SATISFIED

Concrete basement in Japanese quarter. Note the old basement flooring material elevated from the ground so that rats will not harbor in it. Thousands of citizens did work in this way which is not accounted for in the official figures.

emptied; in order that the tide might ebb and flow freely in it and keep it partly clear of rat food.

The Committee on Water Front made a special report of conditions and requirements on April 30th, which was ordered printed "for the information of the municipal and State authorities and the civic organizations of San Francisco." A measure has just passed the Legislature to submit to the people of California a proposal to bond the State for nine million dollars, (interest and sinking fund to come from the San Francisco port revenues) to carry out improvements, including extensions of the seawall, that will make the water front as nearly rat proof as a water front can be. The program will, however, take years to execute. Meanwhile much trapping and poisoning has been done and more attention paid to the use of rat guards, and of fenders to keep ships from too close contact with the wharves. Ships have been fumigated by thousands, and, where foreign governments insisted on it, the Federal health officers have issued certificates to the effect that exports have been stored, previous to being shipped, in rat proof warehouses.

CHAPTER XXXV.

BUTCHERTOWN.

No plague-infected rat was ever found in San Francisco's slaughterhouse district; but that district was not superior in point of order and cleanliness to similar ones elsewhere, and it was a certainty that if plague got among its myriads of rodents the task of eradication would be almost beyond human power.

Sixteen representatives of the slaughterhouse interests appeared before the Executive Committee. They were told that Butchertown conditions made it the worst danger point in the City, that the Butchers' Reservation must be cleaned up and that they must do it, and that if they did not attend to it immediately and thoroughly, radical measures would be taken.

The wholesale butchers appointed a Sub-Committee consisting of E. J. Rodolph, Louis Noonemann and T. J. Harrington. Part of this committee took hold with a will, but among some of the wholesale butchers the idea seemed prevalent that the plague crusade was merely a temporary spasm, and that real action was hardly required. Condemnation suits had to be brought in a number of instances, and a counter suit was brought by one member of the wholesale butchers' committee against the health authorities, but in the end much good was accomplished. About eight places were condemned and demolished. In others, old floors were ripped out and concrete substituted, rat holes were stopped with galvanized iron, improved methods of disposing of blood and scraps were devised, the practice of dumping offal into the bay, whence it washed

back on the beaches under the wharves and hog pens was stopped, unnumbered rats were trapped, poisoned, shot and clubbed to death, and the whole place was given a thorough cleaning up.

Chapter XXXVI.

Stables and Manure.

The ordinary stable is a complete rats' boarding house, and sets an excellent table. Accumulations of manure make warm nesting places, and if the horses and the hostlers fail to scatter enough grain, the wooden bins are easily penetrated. Feed also drops through floor cracks and the animals can get it conveniently near their runs.

Over 200 rats were trapped in one stable in San Francisco. In another locality five stables abutted on a space of twenty by eighty feet, with a lodging house near; and twenty-six plague rats and two human cases came from this focus. It is probable that a neighboring barn infected the refugee camp at Lobos Square, where eighteen human cases of plague occurred before the cottages were raised so that cats and dogs could chase the rats from under them.

When a rat is found dead in a stable the hostler's first impulse seems to be to throw it on the manure pile. If the rats in that barn have plague and the manure pile is a few weeks old it is probably already the portable tomb of several that have gone before. The vegetable grower's wagon stops at the barn on its way back from market, loads up on manure and bubonic rats and returns to the truck patch. This cycle is certain to be reproduced in almost all large cities, for it is the obviously economical and common-sensible way to conduct this sort of industry. But its efficiency as a plague distributer is high, and when plague is present it becomes necessary to interrupt it; and to break up, as far as possible, the populous colonies of rats in stables.

Many of the truck farms supplying San Francisco are either across the Bay or over the San Mateo County line. An order issued by the State Board of Health prohibited the hauling of manure from San Francisco to any other county. It caused much complaint and hostility among the truck farmers, some of whom threatened to shut off, as far as they were able, the City's supply of green vegetables. Others, who did not threaten, showed that this would probably be the effect of the rule if long enough enforced, as vegetables could not be grown without fertilizer.

The embargo on manure was rapidly causing trouble to the stable owners as well, who faced an unmanageable over-production.

It was finally agreed that manure could only be sent out of the City from stables certified to be sanitary and equipped with rat-proof manure bins. And it could only be hauled in metal lined wagons, inspected at the expense of the San Francisco Gardeners' and Ranchers' Association.

This arrangement not only operated to prevent the spread of plague through infected manure and dead rats, but it made the stable owner hasten to put his barn in a shape satisfactory to the sanitary authorities.

By July 1st the Gardeners' and Ranchers' Association ceased to pay for the inspection of wagons and the Citizens' Health Committee took it up and paid the inspector's salary down to the end of October, when it was felt the inspection was no longer needed.

On February 4th was held the initial meeting of the Committee with the representatives of the Stable and Carriage Owners' Association, and with them were representatives of the Draymen's Association and the Street Contractors. The stable owners evinced a disposition to do what was necessary and appointed a sub-committee consisting of L. C. White,

W. J. Gallagher and J. J. Fagen, Mr. White being secretary and Mr. Fagen being president of the Stable and Carriage Owners' Association. This sub-committee went energetically to work, personally persuading stable owners to comply with the regulations, and ultimately reported back to the Citizens' Health Committee as follows:

Mr. L. M. King, *Secretary Citizens' Health Committee, San Francisco.*

Dear Sir:—On January 2, 1908, at the regular meeting of this Association, a committee of seven (including President and Secretary) were appointed to inspect the stables of our members, and report on them, to insist that they be put in clean and sanitary condition, and to impress on the minds of their owners that it is the duty of every business man to assist and keep in touch with the Health Authorities in order to wipe out this plague.

I will say that all the stables in this Association (numbering seventy-six) have been put in full order, in all requirements, as set forth by the Federal and Local Health Authorities, and to-day the stables in San Francisco are in a condition never dreamed of prior to the "rat crusade."

Many of them have been concreted, with new sewers and new drainage, and all have been "rat proofed."

Metal-lined grain and manure bins have been installed, and a great quantity of disinfectants has been used; and while it was pretty hard to get some of the stables (especially those outside the Draymen's and our Association) to comply with all the requirements without the aid of threats of Dr. Blue and Dr. Broderick, backed up by the Courts, yet the desired result was accomplished, and the stable owners did their share of cleaning up the City.

There is no question but that they are gratified with the results, and I am instructed to say on behalf of this Association that the timely action of the Citizens' Health Committee, and the vigorous work done by its several committees, have rendered untold benefit to San Francisco and its people—and they, every man, woman and child, owe those men a debt of gratitude that should not be forgotten.

Thanking you for your assistance in behalf of the Stable Owners, and tendering you from the Stable and Carriage Owners' Association the heartiest congratulations on your successful campaign against the plague, we remain, yours truly,

Stable and Carriage Owners' Association,
By L. C. White, *Secretary.*

The Sub-Committee from the Draymen's Association consisted of F. A. Devlin, George Renner, H. M. Englander, G. E. Hart, and Matt Harris; from the Street Contractors, A. E. Buckman, J. W. MacDonald, D. J. O'Neill, Broderick Jones, William Healy and David R. Church. Their jurisdiction and work coincided largely with those of the Sub-Committee from the Stable and Carriage Owners' Association.

After sufficient experience, the requirements of stable sanitation were embodied in a set of regulations adopted May 20, 1908, by the City Board of Health. These regulations will be found in the appendix.

There were 5,292 stables in San Francisco. In 3,967 concrete floors were laid. Rat-proofing, satisfactory to the authorities, by sheet metal, elevation, and other means, was permitted in the cases of 903 of them that were recognized as temporary structures guaranteed to be torn down in two years. Three hundred and seventy-three were vacated and many of them demolished; and legal actions are now pending against 49.

The concrete flooring laid in stables in San Francisco amounted in the aggregate to 1,190,000 square feet. The work is still being prosecuted, and every barn in the City will be rat-proof before the sanitary officers stop.

WHAT THE BASEMENT GAVE UP

These buildings stood near one of the railway stations. The pile of refuse and garbage shown in the foreground was taken from beneath them.

CHAPTER XXXVII

WAREHOUSES.

It was necessary to give the warehouses almost the same treatment as the stables received, in order to advance the same general process: that of "building out" the plague. What warehousemen lose through rats in a few seasons would probably rat-proof their warehouses, and the saving subsequently would be clear gain. This proposition was pointed out to the warehouse owners by the special committee, of which Dr. Charles G. Levison was the head, and every effort was made to induce rat-proofing, without resort to litigation.

The warehouses of the City were given a thorough inspection by Dr. Blue's men and the owners were asked to meet the Executive Committee and hear the report read. The recommendation of the Federal inspectors were specific, and the warehousemen expressed a willingness to do all they could to comply with the requirements. The amended building ordinances, which will be found in the appendix, covered their case in part, as they provided for concrete floors in all basements within a certain district, rat-proof foundation walls, and rat screens on all openings in foundations.

Several warehouses had to be condemned and torn down. Sometimes the entire contents would be shifted to allow gangs of ship caulkers to stop the cracks and small openings. Sides of doorways were lined with metal so that no rat could chew his way through. Where hay, grain and food stuffs were carried in over gangways, canvas was suspended beneath to catch the siftings so that no rat food should be left on the ground.

The last two bubonic rats caught in San Francisco were taken in a warehouse, where they had been attracted by some fruit and nut culls left carelessly about, had evidently entered by an open door, and had climbed five stories up an elevator rope. These facts were pretty well verified by expert rat catchers, and show how extremely careful it is necessary to be in conducting this class of business.

The condition of the warehouses in San Francisco has been vastly improved. Everyone has been rat-proofed with concrete, or metal, or both, and all the new ones are being built of concrete and are rat-tight from the beginning.

The inspection of warehouses and proper notation of their defects is expert work, and is best done by special sanitary officers of long experience.

Chapter XXXVIII.

Markets, Bakeries and Restaurants, Hotels and Lodging Houses.

Several markets were established in wooden shacks after the fire and one of them produced seven or eight plague-infected rats. An ordinance was passed, which will be found in the appendix, requiring all markets to have concrete floors and conform in other respects to sanitary essentials.

Representatives of the Pacific Coast Master Bakers' Association, of the San Francisco Hotel Men's Association and of the restaurant keepers were called into conference. The Master Bakers' Association and the Amalgamated Restaurant and Hotel Keepers' Association put out a printed call which will be found in the appendix. These circulars were distributed to every hotel, restaurant and bakery. Restaurant keepers were warned to keep all food out of reach of rats, and all garbage in tight metal cans.

The Sub-Committee from the San Francisco Hotel Men's Association, consisting of John G. Barker, Gustav Mann and O. Rich, did good work in listing and inspecting the hotels and demanding from each an accounting of traps set and rats caught.

Chapter XXXIX.

Chicken Yards.

Sacred among the palladia of American liberty is right to keep chickens. A main point of a city's weakness in the face of advancing plague is presented by the domestic chicken yard.

Commonly, there is a board walk leading to the chicken yard from the house—with a rat-run under it. Feeding the birds is accomplished by strewing grain on the ground, or opening the rickety gate and "scraping the plate" into the enclosure of old laths. The rats of the neighborhood burrow into it and feed among the poultry, and drill their way to the store of grain or other chick feed kept in the basement or the laundry.

There were over 16,000 of these danger points in San Francisco. When it is considered that they form a zone roughly corresponding to the advance-line of a city's suburbs, and are thick among the houses in its poorer quarters, it may readily be seen that they invite the inroads of plague from every direction and offer broad avenues for its spread.

The number, the varying intelligence, and the temperamental diversities of the people that keep chickens—their passive resistance, and infinite strategems, and degrees of "pull" when threatened with prosecution—make the chicken yards one of the most troublesome problems of a plague campaign.

Just how that problem should be met, in detail, San Francisco has not thoroughly tried out. There was continuous inspection, suggestion, persuasion, pressure; and an ordinance

was passed under which prosecutions could be instituted more readily than for merely "maintaining a nuisance." We present the ordinance in the appendix, but it is not a perfect model. It aims to make chicken yards rat proof in certain definite ways that under some conditions are impracticable; for example, by enclosing them in a brick or concrete wall a foot high, providing them with a concrete floor, and surrounding them with wire net at least six feet high. The varying conditions of soil and topography, whether the "back yard" happens to be of soft formation, or rocky and irregular, and whether level or steep or artificially terraced, often make it impossible to accomplish rat-proofing by foundation walls except at a prohibitive price. And this brought about what was, perhaps, the best effect of such efforts and regulation—that thousands of chicken yard proprietors went out of that form of domestic industry and began to draw their ovarian diet from Petaluma.

The author of a valuable monograph on the San Francisco sanitary campaign, one of our best informed journalists, himself a confirmed chicken keeper, has suggested that the best sort of ordinance would be one simply providing that poultry yards be made rat-proof, leaving the method of rat-proofing to competent inspectors.

That is about what was done in San Francisco. The chicken yards that survived were made rat proof, but not all in the same way, and many without conforming to the ordinance. About 11,000 owners are said to have disposed of their fowls. The chicken yard area concreted or graveled, which in many cases served as well, aggregated 676,000 square feet.

Chapter XL.

Domestic Rat Harbors.

The danger that was common to all parts of the City, and to almost all premises, but especially to private residences, was the sort of rat harbor formed by board walks in gardens and back yards, planked back areas, and floors close to the ground, in basements and cottages. Miles of such construction had to be ruthlessly condemned and torn out, and concrete or gravel had to be substituted for it; and in hundreds of these cases it was extremely difficult to convince the owner that his innocent plank walk or bit of flooring was a danger in any sense at all. In reality such construction was of the most perilous nature, not only because rats could nest under it, but because it sheltered their runways and gave them an opportunity to travel about unmolested by cats and dogs.

One man that died of plague slept in a small cottage, with a low floor, perforated by rat holes directly under his bed. Dead plague rats were found beneath the floor, and it is probable that the fleas ascended through the rat-holes. Ultimately, all such structures were "rat-proofed by elevation," permitting cats to chase the rats away from human dwellings. This simple expedient was the invention of Dr. Blue, and its effectiveness is one of the most important discoveries of the San Franisco experience.

The health officials caused the condemnation of 493 houses, destroyed 1,713, and disinfected 11,342. The campaign caused the laying of 276,000 square feet of concrete sidewalk,

at a very conservative estimate, and 4,291,000 square feet of concrete in basements and sub-floor spaces. Together with the concrete laid in stables and chicken yards, the total area rat-proofed by this material alone was 6,433,100 square feet.

The People at Work

Backyard furnishing ideal conditions for the propagation and maintenance of rats, undergoing repairs at the hands of the owner and under the direction of the wife, who has caught the sanitary spirit from the women assistants of the Citizens' Health Committee. Thousands of backyards were rendered sanitary in this way that are not accounted for in the official figures.

Chapter XLI.

Sewers; and the Rag Industry.

The Federal sanitary forces did one piece of work in this City that should stand as a monument to them. They inspected the San Francisco sewers, and made rolls of maps of the entire system, on which were indicated breaks and defects of every kind. These maps were invaluable as indications of danger spots underground. The sewers had not been inspected before for twenty years. An immense amount of repair work has been done by the Board of Works, patching them up, and in May, 1908, the people authorized a bond issue of $4,000,000 to rehabilitate the whole sewer system. This work is now well under way. Danger from this point will be absolutely abolished.

One of the most perilous of the community's activities was the rag business, and its allied industries.

We have seen in recent plague history that infection reached Marseilles in a consignment of rags from Bombay.

This material gives transportation to dead rats and living fleas, and the people that handle it run risks.

The Federal sanitary authorities, in co-operation with the State Board of Health, made a careful investigation of the rag industry over the whole State. They found that rags were collected in the filthiest manner, handled in the most careless way, carried into sub-storehouses in basements or small frame shacks, and there sorted and classified. Rags are divisible into three general classes: new rags, consisting of cotton and woolen trimmings and clippings, a considerable quantity comprising old bandages and soiled underclothing, and the ordinary amount of discarded wearing apparel.

A considerable quantity of this material is used in making roofing paper and, in the process, is sterilized and rendered harmless. A good deal of it is used for the manufacture of shoddy cloth and is not sterilized. And it was found that a very large quantity was used instead of waste for wiping machinery. Part of this is sterilized and part is not and the investigation disclosed the fact that men at work were accustomed to using such material to wipe the perspiration off their foreheads, faces and bodies.

The sanitary service induced a man in San Francisco to go into the business of turning out this substitute for waste from clean and sterilized rags and then induced the State Board of Health to put a general embargo on the transportation of all rags unless they were accompanied by a certification that they were clean and sterilized.

A large number of dirty little shacks, to which rag pickers took their material, were condemned and demolished in San Francisco and the whole rag industry was put on a better basis.

CHAPTER XLII.

THE PRODUCE AND COMMISSION DISTRICT.

Before the outlook had cleared or anyone could foretell success, the "commission district" furnished the high light of the picture. On March 21st, less than two months after the campaign started, the commission merchants gave a banquet in the open air, on tables spread in the middle of Front Street, between Washington and Jackson, just to show that their particular streets were "clean enough to eat from."

The feast was attended by the Mayor, the Supervisors, Dr. Blue and his staff, the City Board of Health, representatives of the State Board, City officials in general, ladies of the California Club, and members of the Citizens' Health Committee. Each guest was invited to carry away a souvenir basket of fruit. Across the street was flung a banner reading, "We Have Cleaned Up—Go and Do Likewise." The commission district had in fact, set an example to the entire City, and had done it in the face of extraordinary difficulties.

The "district" contained about nine City squares, and the railway yards from East to Davis and Pacific to Broadway—a matter of twenty-eight blocks, counting by frontages, besides the switch yards of the Belt Railway.

This section was in bad condition, not only because of its natural tendency to produce accessible rat food, in the shape of vegetable trimmings, decayed produce, and horse feed dropped on the street by peddlers and teamsters; but also because of the state of the streets and the hasty character of reconstruction.

The pavements were generally ruined and many of them looked impossible to clean. Business was done in wooden

shacks, built in a rush, block after block of them atop of old cellars full of debris. This huddle of broken streets was filled every morning by a regiment of peddlers' wagons and delivery teams that charged into it like cavalry, rushed away with what they wanted, and left it a litter of refuse and rat fodder. If there was a part of the City where dirt seemed natural and cleanliness hopeless it was here.

The Citizens' Health Committee called for a meeting of the Wholesale Fruit and Produce Merchants' Protective Association. A Sub-Committee was appointed, consisting of John G. Wetmore, Robert K. Malcolm and E. Davis, and the Committee undertook to raise the money and do the work required to make their district clean.

It began by issuing the following circular:

San Francisco, Cal., February 13, 1908.

Gentlemen:—The Committee appointed by J. A. Eveleth (President of this Association), pursuant to action taken at a meeting of fruit and produce merchants, held on February 12, 1908, respectfully call your attention to the following, which, in the judgment of the Committee, is deemed necessary in order to comply with the requirements of the Federal and Local Health Authorities.

You are expected to observe the following rules laid down for your guidance, until further notice:

First—Place one (1) sanitary iron barrel in front of your premises and a sufficient number of sanitary iron barrels in rear of your place of business to fully accommodate all refuse you may have at any time. These garbage receptacles to be kept *closely covered.*

Second—You must keep your stores clean at all times—both on the sidewalk and inside.

Third—You must gather up all vegetable matter, banana leaves, or other refuse from in front of your premises to the middle of the street, whether the same came from your premises or was dropped there by outsiders.

Fourth—If you have a blind cellar to your store, cut an opening or openings in same and either use traps in catching or destroying all rats on your premises, or request this Committee to have the proper authorities place traps and destroy the rats therein.

Fifth—If you have wooden sidewalks in front of your premises, have openings cut, if necessary, and have poison placed beneath the sidewalks to destroy all rats therein.

Sixth—You are expected to report to this Committee any violations of these rules by your neighbors or any persons in this District, coming to your knowledge.

Seventh—You are requested to instruct employees in accordance with the above and to request them to report all infringements coming to their knowledge, and under no circumstances sweep dirt or refuse into the street.

Eighth—Report any teamsters who feed horses and do not clean up the grain spilled from feed bags or other feed receptacles.

Ninth—Will formulate rules and have them printed, and place them in all stores at earliest possible date.

E. DAVIS,
J. G. WETMORE,
R. K. MALCOLM,
Committee.

The Committee secured subscriptions amounting to $10,707.31, independent of the general subscriptions of the Citizens' Health Committee. It employed an average of twenty-six men, and had the streets in its district swept and sprinkled daily. The whole section worked as one body, generated a common sentiment that stopped the practice of throwing refuse about promiscuously, compelled the use of garbage cans and caused drivers to use care with horse-feed and trimmings.

Almost every shop-front in the whole district soon blossomed out with a placard printed in large letters in red and black ink, twelve by twenty inches in size, telling customers and others what must be done. The contents of this placard will be found in the appendix.

In describing its actual operations, in its report to the Citizens' Health Committee, the Sub-Committee says:

We adopted the block system wherever possible, but in some blocks where the traffic was very heavy we had to do most of the cleaning in

BUILDING OUT THE PLAGUE

Citizens concreting a basement. This was a veritable haven for rodents. The day after attending a meeting held by the Citizens' Health Committee the owner of this property got busy.

the afternoon, using gangs to clean those particular blocks every day. In this way the whole district was left clean every night, thereby removing all food for rats. Mr. Michael Casey, chairman of the Board of Public Works, furnished the teams to haul away the dirt and also sprinkled the section throughout, and we are pleased to say the City is now cleaning this section with machines every night and it is kept in very clean condition.

From the time of our appointment this Committee has been very busy in inspecting premises in this district. We have worked in harmony with Dr. Woolsey, of the United States Medical Corps, and his assistants.

In our work we were ably assisted by Captain Michael Joseph Conboy, of the Harbor Police Station, who placed men wherever suggested and who enforced the rules for cleanliness throughout. We are pleased to say that the work accomplished has given general satisfaction to the subscribers in this district and we have established conditions which we think will be permanent.

Captain Conboy assigned to special service in this section a detail of four men, who reported to the Committee every morning at 5 a. m., and through whom the fruit and vegetable peddlers and the five hundred or more retail dealers' drivers that visit the district every day were educated to keeping it clean.

The work has not stopped in this section. Debris is being cleared from underneath buildings and the wooden sidewalks are rapidly disappearing.

Chapter XLIII.

The First Six Weeks.

By March 19, the Citizens' Health Committee was able to report to Mayor Taylor in part as follows:

Hon. Edward R. Taylor, *Mayor City and County of San Francisco.*

Dear Sir: The Citizens' Health Committee has now been actively engaged in work for six weeks.

At the outset we found that the funds available and the work being done by the Federal officers and the City Board of Health would be wholly inadequate without our assistance. Accordingly a general call was issued for subscriptions to a sanitation fund of five hundred thousand dollars, and already over one hundred thousand dollars has been subscribed. Over three hundred additional rat catchers, laborers and inspectors have been employed by the Federal health authorities and paid by this Committee and many more will be needed.

The following are some of the results secured during the past six weeks:

72,460 premises have been inspected.
884 premises have been disinfected.
171 dangerous houses have been destroyed.
54 buildings have been condemned.
17,564 nuisances have been abated.
56,994 rats have been trapped or found dead.

(Note—Many thousands more have been poisoned in the sewers and washed out into the Bay. Of these no record is obtainable. The number of houses officially inspected weekly has been doubled and the number of nuisances abated has been more than trebled since the Citizens' Health Committee started work.)

But all the above would fall far short of our great undertaking without the active assistance of the entire populace of the city.

We therefore recommend energetic action to arouse public interest. Our Executive Committee has been in session every day to meet committees and act on the multitude of matters presented to us. We have

called and addressed over one hundred meetings in various portions of the City, with different organizations and lines of trade. These have appointed active working committees. Thousands of copies of literature describing accurately the conditions that existed and giving instructions to householders what to do to clean up their premises and exterminate rats have been distributed throughout the City.

The public has been aroused to do its duty and has been aroused in a way such as has never been known before.

In addition, the various improvement clubs have been organized to inspect and clean up their various districts. The California Club has interested the various women's clubs in a house-to-house inspection. Meetings have already been held at over fifty school houses by our School Committee, and parents of school children are there being instructed in practical sanitation.

Respectfully submitted,

CITIZENS' HEALTH COMMITTEE,

HOMER S. KING, *President.*

By L. M. KING, *Secretary.*

Chapter XLIV.

Non-Political Appointments, and the Total Graft.

The number of men employed inspecting property, disinfecting premises, and demolishing rat harbors ran as high at one time as 919. All the premises in thirty square miles of territory were entered and examined, not once but many times, the total number of inspections down to the first of March, 1909, agregating 1,025,977; and there was not a single case of theft nor a complaint of one. In thousands of instances it was necessary to insist upon the destruction and replacement of more or less valuable property, so that the opportunities for small blackmail were numerous and tempting; yet the whole amount of graft known to have been taken in this way was exactly five dollars, and the enterprising recipient was discharged before he got a good start.

The Citizens' Health Committee paid the salaries of most of the inspectors and laborers, but it kept its hands off the appointments. Hundreds of men applied to the Committee for jobs, many through the heaviest subscribers to the fund, but the general rule of the members was to recommend nobody, and most of them refused even to write letters of introduction. This left to Dr. Blue and his executive officer, Dr. Rucker, entire power of selection and full responsibility for the choice made, in approved civil-service-reform fashion. If they failed to get satisfactory results they could never plead as an excuse that incompetent men had been foisted on them by the Committee. The result was that the men employed were, in the main, young,

energetic, and intelligent, and inclined to put in a day's work for a day's pay. It was recognized by those in charge as a life-saving service, and no place for old men, sick men, men with a pull, cripples, or any one else with a possible excuse for not doing his work. The total exclusion of the political principle of job chasing for the job's sake was a vital element of success, and accounts in large part for the return of the nineteen-per-cent dividend to the subscribers, and the saving of the City from quarantine.

Chapter XLV.

House-to-House Inspections.

At headquarters of the Provisional Plague Districts regular schools of instruction were established, where the inspectors were not only taught about the nature and habits of rats, but were drilled in the proper ways to go about their work. Owing to the Committee's campaign of education, it was soon found that the majority of people when properly approached were disposed to be accommodating about these visitations, though loath to admit that they had any rats.

At sanitary headquarters were kept card indices with records of the results of inspections and trapping at every house where rats had been caught or sickness found—a complete sanitary history of the premises. In cases where condemnation proceedings became necessary and the owners tried to deny that their property was insanitary, these records were of the greatest value.

Early in the campaign Dr. Blue described in a public statement the way in which the field forces operated. He said:

> These men engaged in rat catching and sanitary cleansing are divided into groups and they work in defined districts. Each group of men is in charge of a foreman. This foreman is the man invested with legal authority and the men generally are not so vested with any police power. The foremen have been provided with proper badges; the men under them have no badges. The foremen are veterans in this work and are men of reliability and experience.
>
> When a man connected with the health service comes to your door, if you are not satisfied with his appearance, make him produce his foreman.

Under no circumstances permit any of these men to go unaccompanied through your house. It is against our rules for any of our men to enter a house during the absence of the occupants; and it is also against our rules for any of our men to go alone into any building—he must be accompanied by some one connected with the premises.

In the event of any misunderstanding send for the foreman, who will be in the block with the men who are catching rats and cleaning up. If any subordinate is denied admission to a house or building he must report to his foreman, who will endeavor to adjust the difficulty.

There is a distinction between inspectors and employees. Many of the inspectors are physicians and all are men whose appearance will indicate that they are not rat catchers or laborers.

Let the public understand that badges are not issued indiscriminately to a large number of men. Our new men are assigned to duty under the experts who have been in the field since last September. It is purposed to train these men in sanitary work, and we ask the public to put no unnecessary difficulties in their way.

CLEAN ENOUGH TO EAT FROM

The Banquet Set in the Street. How the Produce and Commission House District celebrated the destruction of its rats and the scientific sanitation of its quarter of the city.

CHAPTER XLVI.

BOUNTIES, TRAPS AND POISONS.

The Citizens' Health Committee disbursed over $12,000 in rat bounties at ten cents a head during the first few months of its work. The Board of Health had tried a five-cent bounty, but it seemed to be merely boy's pay, and failed to produce thorough and determined pursuit. The Board then raised it to ten cents, with better results. In February the Committee was informed that the Supervisors would approve no more rat bounty demands of the Board of Health, so this body took up the burden.

Those that caught rats were warned not to touch them with their hands, but to dip them in boiling water, or kerosene, handling them with tongs or a stick.

The Executive Committee was authorized to raise the reward, if necessary, to twenty-five cents for males and fifty cents for females, but the bounty of ten cents was found high enough to produce the proper slaughter without tempting unscrupulous people to breed the animals or import them, and it remained the rate until the number of plague rats declined to nothing, when special rewards of $2.50 and later $5 were offered for single infected specimens. Only two have been found at this price.

The bounty is an effective instrument, not only because it causes rat destruction, but because it brings the cadavers to the district sanitary headquarters where the rewards are paid. It was vitally necessary that the laboratory should receive the bodies; and not only of those caught, but of those found dead, as well.

The regularly employed rat catchers received the bounty in addition to their wages.

That the price fixed, ten cents, worked well in San Francisco was evident from the results, which are fairly represented by part of the February catch.

The total catch for the week ending February 10 was 7,307. Of these 2,382 were examined bacteriologically and twelve found to have plague. On February 15 Dr. Blue was authorized by the Committee to employ two hundred additional inspectors and rat catchers immediately, whose salaries the Committee would pay. By March 29 the week's catch had increased to 11,165. Bounty was paid on 7,559 of them. These were rats actually turned in. The poisoning squads that week placed 238,474 pieces of bait buttered with arsenic and phosphorus paste, which must have raised the rat mortality by thousands. The previous week they had placed 275,587 pieces of poison, the week following 175,604, the week after that 170,157, and the week after that 207,894; so that thousands of the undesirables died in the sewers and were washed into the bay, where they could be seen floating in rafts near the outfalls. At this period the laboratory on Fillmore Street was examining three or four thousand rats a week, and finding from three to twenty infected.

In April the catch began to decline and has gone almost steadily downward, the numbers having diminished to such a degree that the labor no longer yields the same results, although trapping and poisoning continue. In the week ending January 4 only 1,841 were trapped and 55 found dead.

Before the Federal Government took over the main financial burden, the forces in the field, numbering, at different times, from 400 to 919 men, had to be supplied with ammu-

nition. Here is a sample requisition made by Dr. Blue for materials, the purchase of which the Committee authorized for its account:

60 bbls. liquid disinfectant @ 95 cents a gallon	$2,850.00
3000 lbs. cheese (for bait) @ 15 cents	450.00
2000 lbs. bacon (for bait) @ 15 cents	300.00
4000 lbs. poison @ 23 cents	920.00
100 drums chloride of lime @ .0225 (40,000 gallons)	900.00
100 bbls. carbolic acid @ 26 cents a gallon (5000 gallons)	1,300.00
	$6,720.00

Another requisition called for 10,000 cage traps, 20,000 snap traps, 2,000 pounds of arsenic paste, 100 drums of chloride of lime, 25 barrels of creofect, and two barrels of insecticide; amounting in all to $9,060.

The chlorinated lime was put into cracks in walls and floors to kills fleas and their eggs. Some of the tons of poisoned food, put in the sewers and under wharves, and in other places where it would do the most good, accounted for the schools of dead rats that passengers on the ferry boats reported floating in the Bay.

Chapter XLVII.

Some Minor Details of Committee Work.

The Executive Committee's first work was to issue 290,000 circulars, like those in the Appendix marked Exhibit A, in English, Italian and Greek. With them went an equal number like Exhibit B.

The "kitchen cards," Exhibit C, were not only given to householders to be hung in their kitchens, but an additional distribution was made by giving every school child one to take home. Copies of all circulars the Committee issued will be found in the exhibits, in facsimile as far as possible.

For the first month a press agent was secured, to furnish the press with authentic news of the sanitation work; and such newspapers as could be induced to publish the information thus furnished materially aided in forming a better public sentiment.

The Committee finally called upon the editors of the reluctant part of the press and insisted that they give their readers news of the situation, the Committee guaranteeing to furnish facts. For some months the press in general did give publicity to the Committee's reports.

The Committee enlisted a great many volunteer inspectors. It issued badges to them as credentials, and to some the Police Commission gave authorizations to make arrests. This force served gratuitously and was of the highest value.

It had been almost customary for Boards of Health to overestimate their needs, knowing that the Supervisors would scale down the appropriation accordingly, and for

the Supervisors to scale down the appropriation, knowing it had been overestimated. This year the Health Board needed all it asked for, and on its request a special committee of the Citizens' Health Committee examined its budget, found it conservative, and certified that fact to the Supervisors, thereby averting a misunderstanding and a shrunken appropriation.

The Committee requested the Supervisors to levy an additional tax of three cents on the hundred dollars outside the dollar limit, to cover future sanitary emergencies, which was done.

Dr. Blue was authorized to employ a limited number of men from the Board of Works, for the Committee's account, in closing side-sewers.

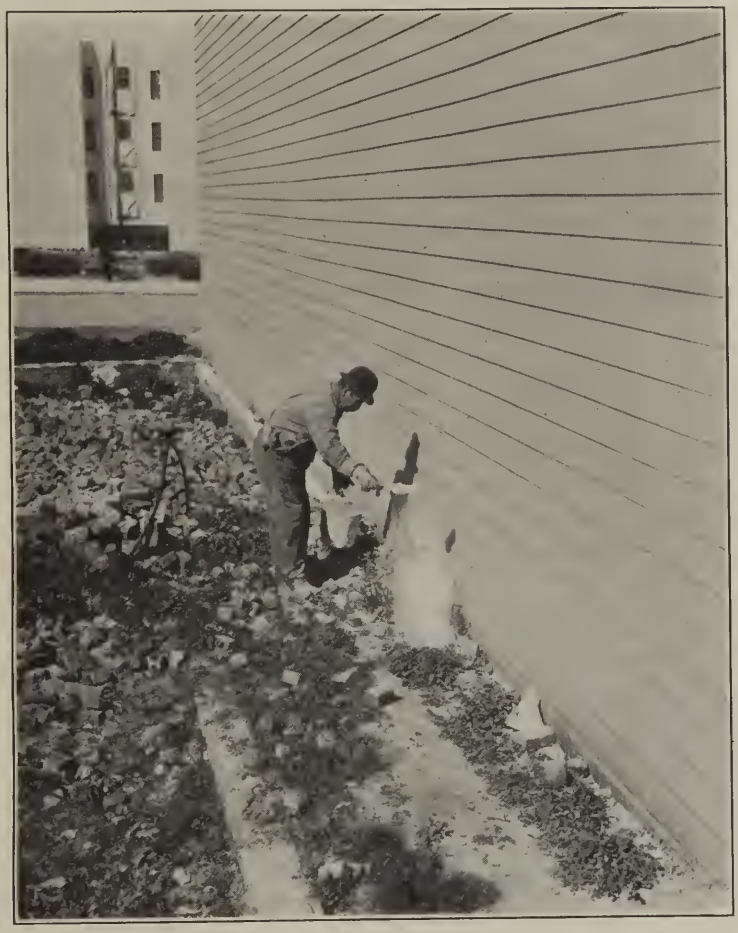
In April the Committee asked Dr. Blue to appoint a woman inspector for the schools of the Telegraph Hill District.

The Committee, in coöperation with the Federal and City health authorities, the Draymen's Association and the Stable and Carriage Owners' Association, worked out the regulations for rat-proofing stables in their present form.

As means of public education on the subject of plague, Dr. Blue's service was equipped with lantern slides for stereopticon lectures.

The matter of sewer facilities for "Liberty Hill" in the Mission was taken up with the Board of Works, and an endeavor made to find a way to supply this and other districts.

When the United States battleship fleet arrived in May, Mr. Symmes, of the Committee, arranged to have Admiral Thomas issue special orders to prevent the dumping of garbage from the ships into the Bay, whence it would have drifted ashore for the rats.



WHY FLEAS ARE SO SCARCE

Employee of the United States Public Health and Marine Hospital Service distributing chlorinated lime about the buildings from which plague-infected rodents have been taken. This is for the purpose of destroying fleas. These ubiquitous insects have been reduced to a minimum in San Francisco.

Nineteen consuls of foreign governments met with the Committee a month after its organization and heard from Mayor Taylor, Dr. Blue, Homer S. King, Charles C. Moore, T. C. Friedlander and others, an exact presentation of the condition of the City and the progress of anti-plague measures. The gentlemen attending seemed assured that the people of San Francisco were in earnest and the situation would soon be brought under control. Probably this meeting was extremely useful in averting a hastily imposed general quarantine.

CHAPTER XLVIII.

KEEPING THE PUBLIC TEMPER SWEET.

First, last and all the time, the General Committee and the Executive Committee had to act as a sort of umpire, and doctor of wounded feelings, to reconcile differences and disputes between officials and private citizens with grievances, and to get the community to accept and assist in the measures that were being taken to protect it.

The best trained police force does not work perfectly, and it would have been impossible for any set of officials to organize hastily such a force as the Committee and the health officials put in the field without admitting to it some men that were tactless or disorderly or inclined to abuse authority. Such persons were weeded out of the service as fast as they were discovered.

To reduce the friction of administration and calm the suspicions of citizens that were afraid they were not getting the square deal was probably one of the Committee's most important functions. It took up all the complaints it could and struggled to adjust them. And the complaints, whether of discriminating treatment by officials or of hardship and expense imposed by the sanitary requirements, were always fortified and embittered by the effects of the seven-years' efforts of some of the newspapers to convince their readers that there was no plague—a proposition that a surprising number of people seemed ready to believe in spite of all contrary authority just as soon as they were required to rat-proof their chicken yards or raise their houses clear of the ground.

During the time the Committee was at work a small army of inspectors was going over the City continually making a house-to-house canvass, and diplomatically or undiplomatically prying into matters the average American considers his entirely private business, such as his garbage barrel, his chicken yard, and the underpinning of his house. The Board of Health was condemning property right and left, and causing expense to hundreds of people. It all made grievances, and plenty of them. In most of the cases it took up, the Committee was able to quiet the complaint and in many it even made an active anti-rat propagandist of the complainant.

It has been estimated that private citizens in San Francisco were called upon to lay out nearly if not quite a million dollars in making their premises rat-tight. In his latest report the president of the Board of Health says:

"By the tactful efforts of the Citizens' Health Committee a very large part of the work was done voluntarily by owners without any friction with the sanitary authorities."

Chapter XLIX.

In Other Bay Cities.

In the meantime San Francisco was threatened with the undoing of all this work by reinfection from the surrounding country even should she succeed in getting rid of the local difficulty, inasmuch as communities about the Bay appeared to have little conception of the real state of affairs. Early in March the San Francisco Chamber of Commerce, of which Charles C. Moore, of the Executive Committee, was president, called a meeting of mayors and health officers, and of officers and directors of commercial organizations, in nearby cities suburban to San Francisco. At this meeting ex-Governor George C. Pardee, representing the Oakland Chamber of Commerce, declared that there was the gravest danger unless all the Bay cities worked at plague eradication at once. Dr. Blue addressed the meeting, saying:

"We of the Federal service do not come here to cry alarm or cause trouble. But we do warn you that if you do not eradicate this disease trouble will come upon you unbidden."

Mr. Moore took the visitors in hand and told them:

"Your interests are in the same jeopardy that ours are; your lives in the same peril as ours. Cities having water connection with San Francisco have plague-infected rats. The Federal doctors, the experts in this matter, are telling us so and are telling you so.

"We are going to stamp out the plague in San Francisco. We don't expect to do it in two weeks nor in two months, but we are working to prevent a quarantine, eradicate the

infection and hold the disease out of this City until the City government and the State Legislature are able to go on with the work. With this stupendous task on our hands it is a shame if the cities and towns in the interior do not likewise stamp out all plague infection.

"While the work is going on in San Francisco it will be much easier for you in the outside towns to get your people aroused. The Federal officers and the San Francisco Chamber of Commerce will give all reasonable assistance to the interior communities in making a common cause for our State and country, and we expect and urge and demand that the business interests outside of San Francisco do their share."

At this meeting addresses were made by representatives from Petaluma, Stockton, and Oakland, who gave assurances that the work being done in San Francisco would not be undone by neglect in the country back of it.

Ultimately, under the prompting of the State Board of Health, the Central Counties Sanitary Association was formed with Dr. Regensberger as chairman and Dr. N. K. Foster secretary, and County supervisors and medical officers in the membership. Special attention was paid to chicken yards near towns. Dr. J. D. Long directed the work for the Federal Government in Oakland. With these points guarded the Citizens' Health Committee felt that its labors had a fair chance of success.

Enforcing Science and Health

In this instance the lady shown in the foreground is erecting an illicit stable in her backyard. Note the inspector in plain clothes talking to her. He is courteously but firmly insisting that concrete must be installed or the building project abandoned. The lady has dissented, and in order that fuller explanation may be given an officer of the Public Health and Marine Hospital Service, the Commander of the District in which these premises are, has been called in.

CHAPTER L.

SOME NEGATIVE RESULTS.

All through the campaign the question was asked, "Why don't they kill off all the rats at once with these contagious rat-disease germs that have been discovered in Europe and that are not harmful to man?"

That resource was not neglected. The health authorities made repeated exhaustive tests of different rat viruses, but conditions in San Francisco were considered unfavorable to their use, and the Committee did not feel like laying out the people's money in that way.

A proposal was made to the Citizens' Health Committee to kill rats in wholesale quantities by pumping the sewers full of carbonic acid gas. It would have cost $2,000 to test the process in a restricted district, and $14,000 to apply it generally if the test were successful. This proposal was rejected, not merely on account of its cost, but because the Committee feared that the gas might enter dwellings and endanger human life.

It should never be forgotten that the mere poisoning and trapping of rats is hardly sufficient to keep their numbers down, much less to accomplish their general destruction—and that it must be accompanied, if valuable results are to be gained, by a wholesale onslaught on their breeding places and harbors and a sudden shutting off of their food supply. Thus far there seems to be no practicable way to destroy a city's rats except by the united work of the whole community.

In the matter of rat-proofing houses, nothing can safely be conceded to individual parsimony. San Francisco does not propose ever to have plague again, and is building it out permanently.

It was found that with the best intentions possible the police force was of little value for the work that had to be done. The members were willing, but too busy. On this subject the President of the Board of Health has said:

> The theory of our charter is that each police officer is also a sanitary officer, and that he shall see to the enforcement of all sanitary rules and regulations, and, if necessary, he shall notify the Board of Health of the existence of public nuisances. In practice this has worked out very poorly. In the sanitary campaign against plague, the Police Department has assisted the Board of Health to the best of its ability, but it is absolutely useless to ask the Police Department to do anything that it can not do without interfering with its main duties. Experience has shown conclusively that the Police Department can not attend to the sanitation of our City. The fact that the police lack the special knowledge required is sufficient explanation. It is also to be considered that their primary duty lies in an entirely different direction, and unless the guardians of sanitation are primarily and solely interested in sanitation it will necessarily be neglected. There is this to be considered also, that, for sanitary purposes, police officers would have to make careful inspections of all premises on their beats, whereas the small number of police officers in the service makes it absolutely imperative that they should remain on the open thoroughfares as much as possible.

No professional solicitors were employed by the Committee to obtain contributions to the sanitary fund. It was felt, and the event proved, that in an undertaking of this kind nothing would be so effective as personal solicitation by men that were themselves contributing.

In regard to the work of the 191 volunteer inspectors it may be said that it was extremely valuable, and every volunteer contributed to ultimate success; but experience demonstrated that such inspectors should limit their activities to examining premises and reporting dangers, and should not attempt, themselves, to abate nuisances and enforce sanitary laws.

CHAPTER LI.

CITY, STATE AND LOCAL HEALTH OFFICIALS.

This City has been fortunate in the character of the men sent to her assistance by the Federal Government. Their methods have been marked by an absence of noise and alarms for which the City can never be too grateful. Dr. Blue's grasp on the situation and his prudent decisions at critical times, the capacity of Dr. Rucker, his executive officer, and the willing industry of all the plague-district commanders, have created among intelligent San Franciscans a high degree of confidence in the United States Public Health and Marine Hospital Service. Especially will the citizens of San Francisco long remember Dr. Blue with gratitude on account of the consideration for their interests which he always kept before him as a guide. The campaign throughout has been conducted with due regard for those interests on the part, not only of Dr. Blue and his staff, but of the whole United States Public Health and Marine Hospital Service, which has acted, from the Surgeon General down, in a way to inspire confidence in the outcome, rather than fear and alarm.

The present Board of Health of San Francisco is particularly worthy of the gratitude of the public. Its members have labored long and hard and with no thought of reward other than the consciousness that they were serving their fellow citizens. They were the legal source of authority throughout, and less unselfish men might have been reluctant to delegate the actual direction of the campaign even to officers of the Federal government. The Board of Supervisors has done its part faithfully, and the State Board of Health has coöperated in every possible way to guard the community.

CHAPTER LII.

CLOSING THE WORK.

In closing its work, the Executive Committee made the following report to the Citizens' Health Committee:

REPORT OF THE EXECUTIVE COMMITTEE OF THE CITIZENS' HEALTH COMMITTEE, FEBRUARY 16, 1909.

To the Citizens' Health Committee.

GENTLEMEN: Your Executive Committee respectfully submits its final report of the work done by the Citizens' Health Committee in coöperation with the Federal, State, and City health authorities in eradicating the bubonic plague in San Francisco and improving the general sanitary condition of the City.

It is just one year since the Citizens' Health Committee was organized and ready for work. For about five months after organization the work of the Committee was active and constant. The Executive Committee met daily for a long time and organized sub-committees throughout the entire City. These sub-committees energetically took up the sanitation campaign and the City received the greatest cleaning up in its history, with the result that the number of infected rats steadily decreased until the infection disappeared entirely and no human cases of the plague developed after the campaign was actively started. The infection among the rats practically ended on July 28, 1908, only two infected specimens having been found since that date, although thousands of rats have been caught each month since and your Committee has had a standing reward of $5.00 for every infected rat discovered. No infection among the rats has been found since October 23rd, and it therefore seems safe to assume that San Francisco is now completely free from the plague.

The Federal Government has from the beginning of the movement made large appropriations for sanitary work in San Francisco in addition to the funds furnished by the City Government, but in order that this work might be carried on properly, it was necessary to supple-

ment the force of men employed by the Federal Government and the City so that the inspection and cleaning could be carried on simultaneously in all sections of the City.

Your Committee has furnished the means by which from one hundred to four hundred additional laborers were employed under the direction of Passed Assistant Surgeon Rupert Blue of the United States Public Health and Marine Hospital Service, who has had charge of all sanitation work in this City. For this purpose your Committee procured subscriptions from the public to the amount of $174,812.38, and has expended $138,943.65, and respectfully submits herewith a complete financial statement of all receipts and disbursements to this date:

FINANCIAL STATEMENT.
February 16, 1909.

Receipts—		
Total cash received from subscriptions		$174,812.38
Disbursements—		
Payroll account—laborers and inspectors	$105,628.43	
Supplies, rat-traps, poisons, etc.	14,980.78	
Rat bounty	12,375.50	
Printing circulars and other literature	1,672.46	
Transportation	459.20	
Collections—expense soliciting subscriptions	141.50	
Expenses general office — stenographers, clerical help, etc.	657.00	
Expenses Committee on Public Inspection, clerical help, expense arranging meetings, etc.	637.50	
Expenses Finance Committee—bookkeeper and all expenses of collecting, etc.	830.25	
Office supplies, stationery, etc.	420.18	
Postage and distribution	711.30	
Miscellaneous	429.55	138,943.65
Balance on hand		$ 35,868.73

The Committee was enabled to perform the necessary work at a smaller cost than was first estimated on account of the splendid voluntary assistance given by the general public as soon as it fully understood the situation. Without this voluntary assistance the Committee

THE SAN FRANCISCO WAY

Steel-and-concrete warehouses, absolutely proof against fires, earthquakes or rodents. Hundreds of such buildings have been erected in San Francisco, making it absolutely safe for foreign ports to receive goods from this city without fear that they may be contaminated by infected rats.

would have been obliged to employ several hundred more men, which would have cost probably several hundred thousand dollars more, making increased subscriptions necessary.

As the work of the Committee is now practically complete, your Committee recommends that after retaining a sufficient amount of the funds on hand to pay for preparing, printing and distributing the final report of the Citizens' Health Committee, and also for the expense of closing up affairs, the remainder be returned, pro rata, to the respective subscribers. We estimate that it would be possible to pay approximately a twenty per cent dividend.

Your Committee is now preparing a complete report of the work of the Citizens' Health Committee and recent sanitation campaign. This report will contain not only a full history of the work from the beginning, but also a very complete description of the methods used to arouse the interest of the public and of the methods pursued in the sanitation work itself, together with a reproduction of all the literature issued. It will also contain reprints of a number of the best articles written by medical authorities on the plague and how to fight it. It is the purpose of your Committee in this way to furnish what, in fact, will be a handbook or manual on fighting the bubonic plague, so that any other city which may be unfortunate enough to be attacked by the disease will have at hand a description of the best means of eradicating it based on practical experience, which is something San Francisco did not have when it started in on its sanitation campaign.

In conclusion, your Committee desires to express its hearty appreciation of the co-operation with its work by the Federal, State and City health authorities. Your Committee has been in constant touch with Dr. Blue and the local Board of Health, who have also regularly attended the meetings of the Executive Committee and have rendered every aid in their power.

In such a sanitation campaign as San Francisco has recently experienced, it is extremely necessary that the officials in charge of the work should not only be competent, but they should also possess great judgment and tact, and we consider that San Francisco was fortunate in having its sanitation campaign in charge of officials who were not only earnest and tactful, but who worked together in such splendid harmony toward a common end.

We also desire to express our appreciation of the aid rendered by the Board of Supervisors, who willingly passed the necessary ordinances required for the work and who furnished funds as liberally as the other needs of the City would permit.

Your Executive Committee considers that the City of San Francisco is extremely fortunate in having so successfully overcome a danger, which a year ago threatened not only the commerce of the City, but also the safety of its inhabitants, and believes that this happy result could only have been achieved through the concerted efforts of the citizens when they were fully informed of the conditions confronting them and what was required of them.

Respectfully submitted,

EXECUTIVE COMMITTEE CITIZENS' HEALTH COMMITTEE.

CHARLES C. MOORE, *Chairman.*

L. M. KING, *Secretary.*

CHAPTER LIII.

MUTUAL OBLIGATIONS.

San Francisco has made a world's record. No other community has accomplished any such result in the same time and under like conditions. In extirpating plague, this City interposed itself as a barrier for the protection of the nation's health as well as its own. The City did not contract plague through its own fault. The pest came here in the nation's commerce, because this is a great seaport. Any other American port is as likely to become infected, and through it the country at large unless the infection is eradicated as promptly and completely as it was here.

In such a case, it is not just that the entire burden of the work should fall upon the city that the plague attacks, for the disease is carried in the shipping of the country, and the country should protect its borders.

Seaports, on their part, however, should watch for symptoms, especially among the rats. They should be careful that they do not provide them food and shelter. They should establish laboratories, trap specimens from all parts of the city, especially from the beaches, wharves and warehouses, make bacteriological examinations of them, and never be without definite knowledge of the condition of the rat population. Above all, if sick rats are seen issuing from their burrows into the open air, and dying in the streets, as they did in certain parts of San Francisco at one time, and as they have been observed to do in ancient epidemics, there should be an immediate resort to the precautions taken in this City.

Mankind is not in the happy position with regard to plague that it occupied sixteen years ago. The disease, to-day, is all over the world, and no one can tell where some migrating rat will carry it next. It is a patriotic duty, incumbent on all, to watch for its appearance, and when it comes, to give prompt warning of it to the local health authorities and to those capable guardians of the sanitary frontier, the United States Public Health and Marine Hospital Service.

APPROVAL OF ACCOUNTS.

SAN FRANCISCO, CALIFORNIA, March 25, 1909.

HOMER S. KING, ESQ.,
Chairman Citizens' Health Committee,
San Francisco, California.

Dear Sir:

Upon the conclusion of our examination of the accounts of the Citizens' Health Committee, we beg to submit herewith statement of the Cash Receipts and Disbursements and our certificate of audit.

We have much pleasure in certifying to the excellent state of affairs found by us upon a most careful and scrutinizing examination. The accounting system under which the operations were carried on was well organized and carefully administered.

In our opinion the officials who have conducted the accounting department are entitled to the highest commendation for a perfect administration.

We are, Dear Sir,
Faithfully yours,
LESTER HERRICK AND HERRICK,
Certified Public Accountants.

FINANCIAL STATEMENT

CITIZENS' HEALTH COMMITTEE, SAN FRANCISCO, CALIFORNIA

FROM ORGANIZATION TO MARCH 19, 1909

RECEIPTS AND DISBURSEMENTS

Receipts			$177,512.38
Subscriptions—Cash		$177,169.05	
Subscriptions—Service		343.33	
Disbursements			139,143.65
Labor and Services		$105,828.43	
Inspectors, rat catchers and laborers			
Supplies		15,030.78	
Disinfectants	$5,744.12		
3,000 gal. R. R. R. Disinfectants	$2,850.00		
91,925 lbs. Chloride of Lime	1,970.92		
1,000 gal. Creofect	725.20		
100 gal. Insecticide	198.00		
Bait	4,012.42		
8,810 lbs. Rat Paste	$2,059.40		
12,930 lbs. Cheese	1,377.93		
5,042 lbs. Bacon	575.09		
Traps	3,836.24		
14,608 Rat and Mouse Traps			
Garbage Cans	1,438.00		
2,776 Cans			
Rat Bounty		12,375.50	
Administration		5,908.94	
Office Salaries	$2,136.10		
Bookkeeper, stenographers, clerical help, etc.			
Printing	1,681.20		
700,000 circulars and other literature			
Postage and Distribution	704.06		
Office Expense	415.50		
Transportation	412.10		
Office Supplies	409.98		
Legal Expense	150.00		
Excess of Receipts			$ 38,368.73
Refund to Subscribers			33,661.85
19 per cent of Cash Subscriptions			
Balance, on deposit in San Francisco Savings Union			$ 4,706.88

CERTIFICATE OF AUDIT.

We have audited the accounts of the Citizens' Health Committee from its organization to March 19, 1909, and certify that the Statement of Cash Receipts and Disbursements herewith showing receipts of $177,512.38, disbursements of $139,-143.65, refund to subscribers of $33,661.85 and a final balance on hand of $4,706.88, has been correctly prepared from the accounts. We have conclusively established the full accounting of all subscriptions, the integrity and accuracy of all disbursements in accordance with full authority and approval, and the final balance by certificate from the depository. We certify additionally that in our opinion the accounts presented show a true and complete record of the actual transactions.

LESTER HERRICK AND HERRICK,
Certified Public Accountants.

SOME STATISTICS OF THE CAMPAIGN.

Cases of Plague in San Francisco since May, 1907, and Items of Sanitation Work Performed between September 23, 1907, and March 1, 1909.

Human plague cases	160
Deaths by plague	77
Sick inspected	1,951
Dead inspected	7,528
Inspections of premises	1,025,977
Houses disinfected	11,342
Houses destroyed	1,713
Nuisances abated	141,569
Square feet concrete sidewalk laid	276,000
Square feet concrete basement and area floors	4,291,000
Square feet concrete laid in stables	1,190,000
Number of stables concreted	3,967
Temporary stables rat-proofed otherwise	903
Number of stables vacated	373
Square feet chicken yards graveled or concreted	676,000
Total square feet concreted	6,433,100
Chicken yards rat-proofed	5,000
Chicken yards voluntarily vacated	11,000
Rats found dead	31,103
Rats trapped	319,734
Total rat catch	350,837
Rats examined bacteriologically	154,840
Rats found infected with plague	398
Pieces of poisoned bait placed	10,063,723
Estimated rat slaughter, including those poisoned but not retrieved*	2,000,000

* The estimate of rat mortality is conservative. The poisoning squads kept careful tab on the pieces of poisoned bait that disappeared. Most of this material was placed in the sewers, and for a while shoals of rat cadavers were washed down to the bay, and drifted out to sea.

The Citizens' Health Committee

of

San Francisco

requests the pleasure of your company

at a Banquet

in honor of

Passed Assistant Surgeon Rupert Blue

U. S. Public Health and Marine Hospital Service

as an expression of appreciation by our citizens
of his effective services in the recent sanitation campaign
and to commemorate
the successful conclusion of that work
on Wednesday evening, the thirty-first of March, 1909
at seven o'clock

Fairmont Hotel

APPENDIX

Page.

Ordinances for the Suppression of Plague..... 187

Facsimiles of Circulars and Posters 199

Underlying Principles of Anti-Plague Measures. By Rupert Blue, M. D., P. A. S., U. S. P. H. & M. H. S.. 215

How to Catch Rats. By W. Colby Rucker, M. D., P. A. S., U. S. P. H. & M. H. S. 225

Report of Sigma Xi on Plague Conditions..... 228

Conduct of a Plague Campaign. By Rupert Blue, M. D., P. A. S., U. S. P. H. & M. H. S..... 235

Circular Letter of the Elks. With short history of the Plague and Plague Conditions by Major C. Kieffer, U. S. A. Medical Corps 248

Rodents in Relation to Plague. By Rupert Blue, M. D., P. A. S., U. S. P. H. & M. H. S..... 256

Plague in India. By Major Arthur Henry Moorhead, Indian Medical Service 266

Campaign Against Plague in San Francisco, Cal. By Rupert Blue, M. D., P. A. S., U. S. P. H. & M. H. S... 285

Subscribers to the Citizens' Health Committee Fund.... 296

Ordinances Adopted by the Mayor and Board of Supervisors, City and County of San Francisco, in Connection with the Suppression of Bubonic Plague.

COLLECTION OF GARBAGE REGULATED.

Ordinance No. 357 (New Series).

Section 1. From and after the passage of this Ordinance all garbage, as hereinafter defined, shall be placed by the person, firm or corporation occupying the premises upon which such garbage is created, in a water-tight metal receptacle, which receptacle shall be continuously closed by a close-fitting metal cover. The contents of such receptacle shall be delivered at least once a week to some person holding a legal permit from the Board of Health, issued under the provisions of Ordinance No. 775, entitled "Imposing a License on Scavenger Wagons."

Section 2. The person collecting such garbage under the terms of the preceding section shall deposit the contents of all such receptacles from such receptacle directly into the wagon provided therefor, and shall deliver the contents of such wagon at the Sanitary Reduction Works on the same day that such garbage was placed therein. Any failure on the part of the person so collecting such garbage to observe the requirements of this section will be sufficient to justify the revocation by the Board of Health of the permit issued in accordance with the provisions of said Ordinance No. 775.

Section 3. The term "garbage" as herein used is hereby defined to be all kitchen refuse of residences, restaurants, hotels and places where food is prepared for human consumption, all waste and offal from fish, meat and vegetable markets, and all organic substances of whatever kind or nature unfit for food that are subject to immediate decay.

Section 4. In addition to the revocation of the permit for the cause set forth in Section 2 hereof, the Board of Health shall have authority to hear complaints against any person holding such permit and to revoke the same for insolent or threatening conduct, for the failure to collect garbage under the terms of any contract, or for the violation of any sanitary regulations made by such Board; and no increase of charge for

the collection of such garbage shall be made without the permission of the Board of Health.

Section 5. All members of the Police Department and employees of the Board of Health are hereby specifically required to enforce the provisions of this Ordinance, and shall have the right to enter any and all premises for the purpose of ascertaining as to the sanitary condition thereof, and any person denying or obstructing such entry shall be subject to the penalty herein provided.

Section 6. Any person, firm or corporation violating any of the provisions of this Ordinance shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not more than five hundred dollars, or by imprisonment in the County Jail for not more than six months, or by both such fine and imprisonment.

Section 7. This Ordinance shall take effect immediately.

REQUIRING METAL RECEPTACLES FOR GARBAGE.
Ordinance No. 379 (New Series).

Amending Ordinance No. 357 (New Series) by adding a new section thereto.

Section 1A. Every contractor or builder engaged in the erection or repair of a building is hereby required to provide a water-tight metal receptacle at or near such building being so erected or repaired, within which receptacle shall be deposited any refuse, food or garbage cast aside by the employees or workmen engaged on such building. Said receptacle shall be kept continuously closed by a close-fitting metal cover except at such times when opened for the deposit of such refuse, food or garbage.

Every employee or workman engaged in work upon said building or on the premises surrounding said building who consumes food on said premises is hereby required to deposit in such water-tight metal receptacle in the manner aforesaid all leavings of such food as may be unconsumed or rejected by him, and the casting aside on said premises or throwing about of unconsumed food or of any garbage is hereby expressly forbidden.

REGULATING THE CONSTRUCTION OF STABLES.
Ordinance No. 345 (New Series).

Section 1. It shall be unlawful for any person, firm or corporation hereafter to construct any building or premises to be used as a stable

for horses or mules without first obtaining a permit from the Board of Supervisors and the Board of Health, specifying the name of permittee, and the location of building or premises to be used as a stable and the number of animals intended to be kept therein.

Section 2. It shall be unlawful for any person, firm or corporation to maintain as a stable for horses or mules any existing structure not used at the date of the passage of this Ordinance for stable purposes without first obtaining a permit from the Board of Supervisors and Board of Health, specifying the name of the permittee, the location of the building or premises to be used as such stable and the number of animals to be kept therein.

Construction of Floor and Side Walls.

Section 3. The floor of all buildings or premises hereafter constructed and intended to be used for the purpose of stabling horses or mules must be of concrete not less than three inches thick covered with a layer of cement or asphaltum not less than one-half inch thick.

Section 4. A semi-circular or V-shaped gutter drain shall be constructed at the time floor is put down in the rear of those portions or parts of the premises where stalls are to be constructed.

This gutter drain shall have a uniform thickness as is set forth in the construction of the floor of the stable and shall not be less than four inches inside measurement at the floor level, nor less than three inches in depth, with sufficient fall to carry off all liquid discharges from the stalls.

Section 5. In all buildings hereafter constructed for stable purposes the side walls or foundation of the structure shall be of concrete or brick laid in cement mortar not less than eight inches thick at the top and shall continue to a height of not less than one foot above the surrounding surface soil, and shall have no breaks or openings except where necessary for doors.

Section 6. Wash racks, when located within the stable, must be provided with surface drain to connect with sewer, provisions for same to be made before putting down the floor.

Section 7. Gutter drains in rear of stalls shall drain into sewer in such manner as to fully comply with provisions of Ordinance No. 1504 of the Board of Supervisors.

Section 8. Every person, firm or corporation now and hereafter maintaining any stable or other place in which manure or stable refuse accumulates shall provide a galvanized iron, tin, zinc, or other metal-lined box or bin within the area walls of the stable; said box or bin shall be vented by means of a duct or flue not less than twelve inches square extending through the roof. The termination of said vent shall be carried above the roof of adjoining premises, and in no instance be less than ten feet from any window or light well.

Section 9. All manure or stable refuse must be removed from the stable at least semi-weekly, and at all times shall such stable or other place, and every part and appurtenance thereof, be kept in a clean and sanitary condition.

Section 10. No ventilators or windows which may be used as ventilators shall be constructed in the area walls of the stable if within ten feet of adjacent property lines, except by special consent of the Board of Health, which must appear on the face of stable permit.

Section 11. All stables must be ventilated by means of Louvre ventilators in the roof, or by openings in area walls where said walls are more than ten feet from adjacent property lines, except as provided in Section 10 hereof.

Section 12. Every stable or other place, where horses or mules are kept, must have not less than 1,000 cubic feet of air space in the clear for each and every animal kept therein.

Section 13. It shall be unlawful for any person, firm or corporation to use any stable or other place where animals are kept as a place of storage for fruits, vegetables, meats, milk or any other food stuffs.

Section 14. All feed excepting hay shall be kept in a metal lined bin or metal lined room, so constructed as to be rat-proof.

Section 15. The provisions of this Ordinance shall apply to all stables that shall hereafter be conducted in structures which are now existing but are not used for stable purposes at the date of the passage of this Ordinance.

Section 16. Any person firm or corporation, or any servant, agent or employee of any person, firm or corporation, violating the provisions of this Ordinance shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than five ($5.00) dollars nor more than five hundred ($500.00) dollars, or by imprisonment in the County Jail for not less than six (6) months, or by both such fine and imprisonment.

PROVIDING SANITARY REGULATIONS.

Ordinance No. 369 (New Series).

Providing sanitary regulations for the protection of the public health in the City and County of San Francisco, and particularly to prevent the propagation and spread of the bubonic plague through the medium of rats.

Be it ordained by the People of the City and County of San Francisco, as follows:

Section 1. This ordinance is designed to and is enacted as a police and sanitary regulation for the protection of the public health, and particularly to prevent the propagation and spread of bubonic plague through the medium of rats.

Section 2. The Health Officer of the City and County of San Francisco, or any agent or inspector appointed by him or by the Board of Health for the purpose, shall have authority, after announcing the purpose of his visit, and shall be permitted to enter any building or premises, or any part thereof, in the City and County, between the hours of nine o'clock in the forenoon and five o'clock in the afternoon of any day, for the purpose of inspecting the same, and to ascertain whether the provisions of this Ordinance have been complied with by the owner and occupant thereof.

Section 3. All buildings and basement walls of all storerooms, warehouses, residences, or other buildings within the City and County; all chicken yards or pens, chicken coops or houses, and all barns and stables, shall be so constructed or repaired as to prevent rats from being harbored underneath the same or within the walls thereof, and all food products or other products, goods, wares and merchandise liable to attract or to become infested or infected with rats, whether kept for sale or for any other purpose, shall be so protected as to prevent rats from gaining access thereto or coming in contact therewith. All storerooms, warehouses, residences or other buildings in said City and County shall be provided by the householder or his agent with one or more traps of a pattern approved by the Health Officer, which traps shall be freshly baited at least twice each week by the householder or his agent, and shall be inspected daily by the householder or his agent, and any rat or rats caught therein shall be killed and destroyed or delivered to the Health Department, or its duly authorized deputy, or killed and then destroyed by burning, and such trap or traps thoroughly smoked and reset and rebaited by said householder or his agent.

Section 4. All public and private docks and wharves in the City and County, wherever located, shall be so protected as to prevent rats from gaining entrance to such docks or wharves at either high or low tide from vessels anchored or moored alongside of such docks or wharves, or from other sources, and all food products stored in docks or wharves shall be so kept and stored as to prevent rats from gaining access thereto or coming in contact therewith. All docks and wharves shall be provided with two or more traps of a pattern approved by the Health Officer; traps shall be freshly baited at least twice each week, and shall be inspected daily, and all rats caught therein shall be killed and delivered to the Health Department, or its duly authorized deputy, or killed and then destroyed by burning, and such trap or traps shall be thoroughly smoked and reset and rebaited.

Section 5. All slaughterhouses of every kind and nature and wherever located in the City and County shall be so protected as to prevent rats from gaining access to the building or buildings thereof, and all holes and openings in the building or basement walls shall be thoroughly stopped with cement or other material approved by the Board of Health, and all food products stored in slaughterhouses shall be so kept as to prevent rats from coming in contact therewith.

All slaughterhouses shall have at least two traps, or as many more traps as may be required by the Board of Health of pattern approved by said Board, which traps shall be baited with fresh bait at least twice a week, and such traps shall be inspected daily by the owners, lessees or agents thereof, and all rats caught therein shall be killed and delivered to the Health Department, or its duly authorized deputy, or killed and then destroyed by burning, and the trap or traps thoroughly smoked and reset and rebaited by said owners, lessees or their agents.

Section 6. All buildings, places and premises whatsoever in the City and County shall at once be placed, and shall continuously be kept, by the owner or the occupant thereof in a clean and sanitary condition, and free from rats.

Section 7. No person, firm or corporation shall have or permit upon any premises owned, occupied or controlled by him or it, any nuisance detrimental to health, or any accumulation of filth, garbage, decaying animal or vegetable matter, or any animal or human excrement; and it shall be the duty of the Health Officer of the City and County to cause any such person, firm or corporation to be notified to abolish, abate and remove such nuisance, and in case such person, firm or corporation shall fail, neglect or refuse to remove the same within one (1) day after re-

ceiving such notice, such nuisance may be removed and abated under and by order of the Health Officer, and the person, firm or corporation whose duty it was to abate or remove such nuisance, in addition to incurring penalties in this Ordinance provided, shall become indebted to the City and County for the costs and charges incurred by the City and County by reason of the existence and removal of such nuisance.

Section 8. No person, firm or corporation shall dump or place upon any land or in any water or waterway, within the City and County, any dead animals, butchers' offal, fish or parts of fish, or any waste vegetable or animal matter whatever.

Section 9. No person, firm or corporation, whether the owner, lessee, occupant or agent of any premises, shall keep or permit to be kept in any building, area way, or upon any premises, or in any alley, street or public place adjacent to any premises, any waste animal or vegetable matter, dead animals, butchers' offal, fish or parts of fish, swill or any refuse matter, from any restaurant, eating place, residence, place of business or other building, unless the same be collected and kept in a tightly covered or closed metal can or vessel.

Section 10. No rubbish, waste or manure shall be placed, left, dumped or permitted to accumulate and remain in any building, place or premises in the City and County so that the same shall or may afford food or a harboring or breeding place for rats.

Section 11. Any person, firm or corporation violating or failing to comply with any of the provisions of this Ordinance shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine in any sum not exceeding five hundred ($500) dollars, or by imprisonment not exceeding six (6) months, or by both such fine and imprisonment. Each day's violation of any of the provisions of this Ordinance shall be construed as a separate and distinct offense.

CONCRETE FLOORS IN MARKETS.

Ordinance No. 368 (New Series).

Adding a new section to the "Building Law."

Section 268-B. All floors of buildings used as markets must be constructed of concrete or other fireproof material covered with a wearing surface of concrete; or if of wooden construction such floor must be covered with water-proof material, the same to run up on the walls at least eight inches in height; over this waterproof material there shall be placed a wearing surface of concrete at least one and one-half inches in thickness, troweled to a smooth surface.

FLOORS IN YARDS, ETC.

Ordinance No. 382 (New Series).

Adding a new section to the "Building Law."

Section 314-A. All floors of yards, courts and passageways shall be of earth, sand, gravel, cinders or other similar material, or of concrete. No such floors shall be constructed of wood.

RAT-PROOFING BASEMENTS.

Ordinance No. 489 (New Series).

Adding a new section to the "Building Law."

Section 268-A. All buildings shall be made so as to be impervious as possible to the ingress of rats or other vermin. The foundation walls shall be of concrete or of brick or stone laid in cement mortar, or some equally rat-proof material, shall extend at least one foot above the surface soil, and shall be at least eight inches thick at the top; and where openings are necessary for ventilation or other purposes said openings must be made rat-proof by suitable metal screens. The full floor area under all buildings must be covered by concrete at least one and one-half inches thick, except where the surface of the soil is composed of hard pan or rock; provided, however, that outside of the following described district, buildings occupying a ground space of not more than 800 square feet need not comply with the foregoing provisions, provided that such buildings are elevated at least eighteen inches above the surface of the ground and the walls supporting the building are left open upon three sides and the space under such building exposed.

The district to which the foregoing exemption shall apply shall be all of that portion of the City and County not included within the following boundaries: Commencing at a point where Channel street intersects the waters of the Bay; thence along Channel street south to Division street, along Division street to Harrision street, along Harrison street to Army street, along Army street to Castro street, along Castro street to Seventeenth street, along Seventeenth street to Stanyan street, along Stanyan street to Fulton street, along Fulton street to Thirteenth avenue, along Thirteenth avenue to the Presidio wall, along the Presidio wall to Lyon street and along Lyon street to the waters of the Bay and along the waters of the Bay to the point of commencement.

REGULATING THE KEEPING OF ANIMALS AND FOWLS.

Ordinance No. 384 (New Series).

Regulating the keeping and feeding of live hares, rabbits, guinea pigs, chickens, turkeys, geese, ducks, doves, pigeons and other fowl.

Be it ordained by the People of the City and County of San Francisco as follows:

Section 1. It shall be unlawful for any person, firm or corporation to keep or feed, or cause to be kept or fed, or permit to be kept or fed, on premises over which such person, firm or corporation may have control, any live hares, rabbits, guinea pigs, chickens, turkeys, geese, ducks, doves, pigeons or other fowl within the limits of the City and County of San Francisco herein below designated unless the same are kept or fed in coops or enclosures complying with the following requirements, to wit:

(1) The floor of said coop or enclosure shall be of concrete not less than two (2) inches thick and covered either with a layer of cement not less than one-half an inch thick or asphalt not less than one inch thick.

(2) The said coop or enclosure shall be entirely surrounded by a brick or concrete wall at least five (5) inches in thickness and one foot high.

(3) The said coop or enclosure shall be entirely surrounded by a galvanized iron wire mesh fence, walls or sides extending at least six (6) feet above the ground, which mesh shall not be greater than one-half inch in size.

Provided, however, that said live hares, rabbits, guinea pigs, chickens, turkeys, geese, ducks, doves, pigeons or other fowl shall be permitted between the hours of sunrise and sunset to run at large within the limits of the premises in which said coops or enclosures are maintained and provided, further, that said coops or enclosures shall be kept closed during the time that said live hares, rabbits, guinea pigs, chickens, turkeys, geese, doves, pigeons and other fowl are so running at large.

The portion of the City and County subject to the provisions of this Ordinance is bounded and described as follows, to-wit:

Commencing at a point where Lyon street meets the waters of the Bay; thence southerly along Lyon street to the southerly boundary line of Presidio reservation; thence westerly along said boundary line to Sixteenth avenue; thence southerly on Sixteenth avenue to Fulton street (formerly D and Fulton streets); thence easterly on Fulton street to Stanyan street; thence southerly on Stanyan street to Frederick street; thence westerly on Frederick street to First avenue; thence southerly on

First avenue to Parnassus avenue; thence in an easterly direction on Parnassus avenue to Stanyan street; thence along Stanyan street southerly to Thirtieth street; thence easterly along Thirtieth street to Castro street; thence southerly along Castro street to a point where, if extended southerly, it would intersect the corner of Mission street and Silver avenue; thence southerly along Mission street to Tingley street; thence along Tingley street to Alemany avenue; thence along Alemany avenue to Bauer street; thence along Bauer street to Mission street; thence southwesterly along Mission street to France avenue; thence along France avenue to Paris street; thence northeasterly along Paris street to Russia avenue; thence southeasterly along Russia avenue to Munich street; thence northeasterly along Munich street to Felton street; thence easterly along Felton street to Madison street; thence northwesterly along Madison street to Silver avenue; thence along Silver avenue in a westerly direction to Mission street; thence northeasterly along Mission street to Canal street; thence along Canal street to the southerly boundary of St. Mary's College tract; thence easterly and northerly along the southerly and easterly boundaries of said tract to Crescent avenue; thence along Crescent avenue to Andover avenue; thence northerly along Andover avenue to Cortland avenue; thence along Cortland avenue in an easterly direction to San Bruno avenue; thence following the line of San Bruno avenue to Islais creek, and the waters of the Bay from Islais creek to Lyon street.

Section 2. It shall be unlawful for any person, firm or corporation to keep or feed live hares, rabbits, guinea pigs, chickens, turkeys, geese, doves, pigeons or other fowl in movable or portable coops in premises which are not rat proof unless the said coops are constructed with a metal bottom and metal sides to a height of at least one foot, surmounted by a metal cage of one-half (½) inch wire mesh.

Section 3. Any person, firm or corporation violating the provisions of this Ordinance shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not more than five hundred dollars or by imprisonment in the County Jail for not more than six months, or by both such fine and imprisonment.

INSANITARY BUILDINGS DECLARED TO BE NUISANCES.

Ordinance No. 501. (New Series.)

Declaring insanitary building structures or parts thereof nuisances and providing for the abatement thereof.

Be it ordained by the People of the City and County of San Francisco as follows:

Section 1. All buildings, structures or parts thereof which are insanitary are hereby declared to be and are nuisances, and the Board of Health is hereby authorized and empowered to abate the same in the manner provided in this Ordinance.

Section 2. Whenever the Health Officer of this City and County shall make written complaint to the Board of Health that any building, structure or part thereof is in an unsanitary condition, the Board of Health shall by formal resolution order a hearing of said complaint and fix the time and place therefor. The complaint shall contain general allegations setting forth the conditions complained of.

Section 3. Upon the filing of such complaint, the Board of Health shall cause a copy thereof, together with a notice of the time and place set for the hearing thereof, to be served personally upon the owner of said structure, building or part thereof complained of, or his agent or the lessee or the occupant thereof, and shall cause a copy of said complaint, together with said notice of hearing, to be posted in some conspicuous place on said structure. The time fixed for the hearing of said complaint shall not be less than forty-eight (48) hours after the service and posting of the copy of said complaint and said notice. Said notice shall require all persons interested to appear at the hearing to show cause, if any they have, why said structure, building or part thereof complained of should not be declared insanitary.

Section 4. The Board of Health upon conclusion of said hearing shall decide upon the facts submitted whether or not said alleged condition constitutes a nuisance under the terms of this Ordinance, and shall embody said decision in a formal Resolution setting forth its findings.

Section 5. The Board of Health, upon its determination and finding that the structure, building or part thereof complained of, is a nuisance, shall order the vacation of same for all purposes, and shall cause a copy of said order to be posted in a conspicuous place on the aforesaid structure, building or part thereof determined by said Board to be a nuisance, and a copy thereof to be personally served upon the owner thereof or his agent, or the lessee or the occupant thereof. The order shall specify the time within which said structure, building or part thereof determined by said Board to be a nuisance shall be vacated, which shall be not less than

forty-eight (48) hours after the passing of said order and the personal service thereof as above provided.

Section 6. The Health Officer shall give a written notification thereof to the Chief of Police, who shall thereupon, through the officers of the Police Department, execute and enforce the said order of vacation.

Section 7. Any owner, or the agent of such owner, or the lessee or the occupant of any structure, building or part thereof ordered vacated hereunder who shall himself or through others forcibly resist or prevent the enforcement of such order shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not less than twenty-five dollars, nor more than two hundred and fifty dollars, or by imprisonment in the County Jail for a period of not less than ten days nor more than three months, or by both such fine and imprisonment.

Section 8. Unless within forty-eight (48) hours after the service of notice to vacate as above provided, the owner, or his agent, or the lessee, or the occupant of said building, structure or part thereof, shall notify the Board of Health in writing that he will make or cause to be made such alterations or repairs as in the judgment of the Board of Health shall be necessary for the purpose of making said building, structure or part thereof sanitary, the Board of Health shall proceed to abate the same. If said notice be given as aforesaid the Board of Health shall grant a reasonable time to make said alterations and repairs. If said alterations and repairs are not made and completed within said time allowed by said Board, the Board of Health shall by formal resolution order, and in accordance with said order, cause the abatement of said nuisance and the destruction of said building, structure or part thereof, herein provided, found and determined to be a nuisance.

Section 9. The structure, building or part thereof vacated hereunder shall not be reoccupied without the written permission of the Board of Health, but such permission must be granted when within the time allowed as hereinbefore specified the alterations and repairs required to be made by the Board of Health shall have been made.

Section 10. Upon the written application therefor of the Board of Health the Board of Supervisors shall allow and order paid out of such fund as the Board of Supervisors may lawfully specify any sums the expenditure of which may be necessary for the enforcement of this Ordinance, and the Auditor shall audit and the Treasurer shall pay such sums so allowed and ordered paid, and the amount so expended shall become a lien upon the property upon which said nuisance was abated in accordance with the provisions of this Ordinance. And said amount may be recovered by an action against said property or the owner thereof.

CITIZENS' HEALTH COMMITTEE

Headquarters Room 1233 Merchants' Exchange

The Plague in San Francisco and Its Extermination

The dreaded "Bubonic Plague" has reappeared in San Francisco since the fire and is gaining ground.

Should the Plague continue to show a marked increase, San Francisco will probably be quarantined. This would be a death blow to the industrial life of the city and would bring ruin to our people and our homes.

The Federal, State and City health authorities are fighting this disease for our benefit. **To insure success, your co-operation is imperative.**

This Plague is primarily a disease of the Rat.

The infection is transmitted by the Flea.

The Flea living on the infected Rat becomes infected.

If the infected Flea bites a human being, that person becomes infected with the Plague.

The percentage of infected Rats has increased three-fold since September, 1907.

The Flea disappears in San Francisco during the winter and reappears with dry and warm weather. The coming of the Flea cannot be prevented, but we can combat the Rat, the source and the breeder of the Plague.

It is incumbent upon all to wage a relentless war on the Rat.

YOUR DUTY

Trap and Poison Rats !

Obey the Sanitary Laws of the City !

Have your Premises Inspected !

CITIZENS' HEALTH COMMITTEE

E. H. Rixford
T. C. Friedlander
Charles C. Moore
R. H. Swayne
James Mc Nab
A. W. Scott, Jr.
Harry M. Sherman, M. D.
John M. Williamson, M. D.
George H. Evans, M. D.
Marŭn Regensburger, M. D.
H. C. Moffitt, M. D.
E. N. Ewer, M. D.
L. M. KING, Secretary,

Gustave Brenner
H. H. Sherwood
Frank J. Symmes
Capt. H. W. Goodall
Walter MacArthur
N. K. Foster, M. D.
John Gallway, M. D.
James H. Parkinson, M. D.
Charles G. Levinson, M. D.
Langley Porter, M. D.
P. M. Jones, M. D.

HOMER S. KING, Chairman

B C

EXHIBIT A. TWO HUNDRED AND SEVENTY THOUSAND OF THESE CIRCULARS, IN ENGLISH, WERE DISTRIBUTED THROUGH VARIOUS ORGANIZATIONS. TEN THOUSAND ADDITIONAL IN ITALIAN AND THE SAME NUMBER IN GREEK WERE PUT OUT.

CITIZENS' HEALTH COMMITTEE OF SAN FRANCISCO

TO ALL HOUSEHOLDERS

KILL THE RATS

TRAPS: The best trap for dwellings, stores, etc., is the large cage trap.

BAIT: To be changed daily between cheese, fish heads, chicken heads, fried bacon, fresh liver and pine nuts.

Bait to be tied on inner side of top of trap.

Smoke the trap after handling and before setting again for other rats.

Cover the trap except entrance with sacking.

Place trap near usual feeding place of rat.

Snap traps are best in butcher chops, bakeries and restaurants.

Bait should be tied on.

POISON: All druggists can furnish a good rat poison. Follow directions. Place in rat holes, beneath floors and in covered places. **DO NOT PLACE WHERE ACCESSIBLE TO CHILDREN.**

DISPOSITION OF RATS: On delivery of dead or trapped Rats at any Health Station, (see reverse side,) a bounty of 10c. per Rat will be paid. Rats should be carried to Station in closed tin boxes or cans.

IF NOT CONVENIENT TO TAKE RATS TO HEALTH STATION, TELEPHONE TO NEAREST STATION AND RATS WILL BE CALLED FOR AND BOUNTY PAID BY INSPECTOR ANSWERING CALL.

(OVER)

EXHIBIT B (FACE). TWO HUNDRED AND SEVENTY THOUSAND OF THESE CARDS WERE DISTRIBUTED. THEY WERE ONE OF THE MOST EFFECTIVE CIRCULARS.

GARBAGE

Clean up your own premises.

Keep all Garbage in Covered Metal Cans.

Keep covers closed.

This will starve the Rat.

Have garbage removed weekly or more frequently.

Don't allow garbage to be thrown on vacant lots around your premises.

Admit any authorized Health Inspector to your premises.

He is there for **YOUR** benefit.

Watch and Report for your own protection unsanitary conditions in your neighborhood.

Tell your neighbors to do the same.

U. S. Public Health & Marine Hospital Service

GENERAL HEADQUARTERS

P A. Surg Rupert Blue, Commanding

401 Fillmore St. Park 878

DISTRICT HEALTH STATIONS

1—A. A. Surg., G. M. Converse, Portsmouth Sq., West 6180
2—A. A. Surg., P H. Thomas, Bay & Van Ness, West 6180
3—A. A. Surg., C. H. Woolsey, Portsmouth Sq., West 6180
4—A A. Surg., L. S. Schmitt, Pine & Larkin, Fkln 238
5—P. A. Surg , C. W. Vogel, Lobos Square, West 3175
6—P A. Surg., R. H. Creel, Scott & O'Farrell, West 6180
9—A. A Surg., J L. Howard, 615 Valencia, Mkt. 580
11—Asst. Surg., J R Hurley 17th. & Bryant, Mkt. 240
12—A. A. Surg., Bruce Ffoulkes, 7th. & Harrison Mkt. 1559
Sub 12—A. A. Surg., H H. Hopkins, 72 Sherman Mkt , 571

EXHIBIT B (REVERSE SIDE OF CARD ON OPPOSITE PAGE). TWENTY THOUSAND ADDITIONAL IN ITALIAN AND GREEK WERE ALSO DISTRIBUTED.

FASTEN THIS UP IN YOUR KITCHEN.

Citizens' Health Committee,
Headquarters, Room 1233 Merchants' Exchange.

TO GET RID OF RATS.

KITCHEN RULES.

Keep all supplies in rat-proof bins.

Keep meats in safes or in refrigerators.

Keep uncooked vegetables in crates on shelves. Never on the floor.

IF COOKING IS DONE WITH A COAL FIRE.

Burn in your kitchen fire all refuse (trimmings of meat, bones, parings of vegetables, egg shells, all platter and plate scrapings, and all waste food) as it occurs. This means the putting into the fire of small amounts at a time, when they will readily burn. This is known to be a practical method. By it there is no garbage.

IF COOKING IS DONE WITH A GAS FIRE.

Keep all garbage in covered metal cans.

Keep the cans closely covered.

Have the garbage removed at least twice a week.

Have scavenger carry your garbage can to his wagon.

Report all scavengers who do not do so.

Don't put garbage in slop hoppers.

Always clean up your own premises.

Throw no garbage into the street nor on vacant lots.

Admit authorized Health Inspectors to your premises. They are there for your benefit.

Tell your neighbors to do all the above—and see that they do.

Report to the Committee all cases of insanitary conditions.

These rules to be in force during the existence of plague and afterwards.

EXHIBIT C. THE "KITCHEN CARDS," THOUSANDS OF WHICH WERE GIVEN TO SCHOOL CHILDREN, AT LECTURES IN SCHOOLHOUSES, TO BE TAKEN HOME. FIFTY-TWO THOUSAND IN ALL WERE PUT OUT; TWO THOUSAND IN ITALIAN.

IMPORTANT MEETING

PLAGUE CONDITIONS

You are invited to be present *at a meeting to be held on* TUESDAY, 28th *JANUARY AT* 2 P. M., on the Floor of The Merchants Exchange, 431 California Street, to consider what action may be necessary to assist and strengthen the proper authorities in their efforts to place the City of San Francisco in such a position that there will be no danger of its being quarantined in the future on account of possible plague conditions. The outlook appears very serious, and requires the co-operation of all citizens.

The situation will be explained by Dr. Blue, head of the United States Marine Hospital Service in this City, and addresses will be made by Dr. Ophuls, President of the Board of Health of the City of San Francisco; Dr. Evans, President of the State Medical Society; Dr. Regensburger, President of the State Board of Health; and by well-known medical practitioners of the City of San Francisco.

No subject is of more importance to the welfare of the City, and your attendance at the meeting is earnestly requested, and you are urged to request others to be present.

THE CHAMBER OF COMMERCE,
C. W. Burks, Secretary.

THE MERCHANTS ASSOCIATION,
L. M. King, Secretary.

BOARD OF TRADE,
H. L. Smith, Secretary.

THE MERCHANTS EXCHANGE,
T. C. Friedlander, Secretary.

THE CALL FOR THE MASS-MEETING OF JANUARY 28, 1908. TWO THOUSAND FIVE HUNDRED OF THESE WERE SENT OUT.

THE PLAGUE

IMPORTANT

TO THE MEMBERS OF THE COMMERCIAL ORGANIZATIONS OF SAN FRANCISCO:

We want you to understand and appreciate that the enclosed circular showing Plague conditions in San Francisco is a **true statement of facts.**

We want you to appreciate the **very serious conditions.**

Unless sanitary conditions are **generally improved** and unless the **number of rats in the city is decreased,** San Francisco will be **quarantined this summer** as sure as the summer will come.

Quarantine will work untold disaster to all and every business interest. It will take the business interests of the City longer to recover from the effects of a quarantine than it took to recover from the disaster of April, 1906.

It is of vital moment that every person does his or her duty.

It is **your duty** to see that **your premises** and **homes** are **freed from rats** and are in a proper condition.

Call a meeting of your employees and impress every individual in your employ with the absolute necessity of energetically attacking the problem.

Make your employees **report to you** what steps they are taking, and make your employees report infractions of health laws by others.

Tell your employees what to do and how to do it.

Any number of the enclosed cards of instruction can be obtained by application at Room 1233, Merchants Exchange Building.

You are called upon to report in writing what assistance, as outlined above, you are giving the Committee. Address your report to the Citizen's Health Committee, Room 1233 Merchants Exchange Building.

THE MERCHANTS' ASSOCIATION OF SAN FRANCISCO,

THE CHAMBER OF COMMERCE OF SAN FRANCISCO,

BOARD OF TRADE OF SAN FRANCISCO,

THE MERCHANTS EXCHANGE.

CIRCULAR SENT TO MEMBERS OF THE FOUR ORGANIZATIONS APPEARING AT THE BOTTOM. TWENTY-FIVE HUNDRED WERE SENT OUT.

IMPORTANT TO HOUSEHOLDERS

Ordinance No. 357 approved February 5th, 1908, requires that **all garbage** shall be placed in a **water-tight metal receptacle,** which shall be **continuously closed,** by a **close-fitting metal cover.** The contents of such receptacle shall be delivered **at least once a week** to some person holding a legal permit from the Board of Health, issued under the provisions of an Ordinance entitled "Imposing a License on Scavenger Wagons."

Collectors of garbage are required to **deposit the contents of such receptacles from such receptacles directly into the wagons** provided therefor. Failure on the part of the person collecting such garbage to observe this requirement will be sufficient to justify the revocation by the Board of Health of his license, and also to subject him upon conviction thereof, to both **fine and imprisonment.**

It is your duty as a citizen to see that your garbage is kept in the **form of receiver required by law,** and to insist upon its **proper removal.**

All members of the Police Department and employes of the Board of Health are specifically required to **enforce the requirements of this ordinance,** and shall have the right to enter any and all premises for the purpose of ascertaining as to the sanitary requirements thereof. Any person denying or obstructing such entry shall be **guilty of a misdemeanor** and is subject to the same punishment as stated above.

The Citizens' Health Committee intends to make **San Francisco a clean city,** and the strict requirements of this Ordinance, both on the part of the householder and garbage collector, will be **rigidly enforced.**

CITIZENS' HEALTH COMMITTEE
OF SAN FRANCISCO

TEN THOUSAND OF THESE WERE DISTRIBUTED.

Sanitary Instructions

TO ALL POLICE OFFICERS

All sanitary "nuisances" must be abated immediately.

City ordinances cover the following requirements and they **must be enforced.** Arrests can be made if sanitary nuisances are not abated after 48 hours notice.

The presence of **garbage** where rats can get at it is a **"nuisance"**

Garbage is any sort of kitchen refuse or anything that rats can eat.

Garbage **must be kept in metal cans** with tight lids and the **lids must be kept on.**

Garbage **must not** be thrown into the street, into cellars, upon vacant lots, or left where rats can get at it.

Watch the scavangers. **Garbage cans must be emptied directly into scavanger wagons,** not into sacks and then taken to the wagons

Workmen on buildings **must not** throw scraps about where rats can get at them. Builders **must provide metal cans** for scraps.

Back porches, porch hoppers, etc., must be inspected and all "nuisances" reported at once.

Inspect most carefully all **markets, butcher shops, bakeries and restaurants;** all food and scraps must be kept away from rats; warn violators and **report them at once.**

All articles on fruit and candy stands **must be screened from rats and flies.**

Stables must be examined carefully. They should have metal lined feed bins and rat-proof manure bins and must be connected with the sewer, or they are "nuisances." Stable **manure must not be piled in vacant lots.** Where ever noted, warn the stableman and report.

All markets must have screen doors and they must be kept shut.

Chicken yards must be kept clean at all times, free from rats and **all feeding must be done in rat-proof yards.**

Frequent inspection of all **boarding** and **lodging houses** must be made. Particular attention should be given to sailors' boarding houses and the regulations governing such, posted in them, must be enforced.

Report promptly any and every nuisance.

REPORT THE LOCATION OF ALL DEAD RATS SEEN.

THREE THOUSAND OF THESE WERE PRINTED, TO BE SENT TO POLICE STATIONS.

Inquiry to all Employees

Referring to the question of infection of *BUBONIC PLAGUE* among *RATS* in San Francisco, and to the circulars recently issued, we request that you answer the following questions either "Yes" or "No," with any interesting notation after each question, under the heading, "Remarks."

1. Have you cleaned up your own premises?
   Answer:
   Remarks:

2. Do you keep all garbage in covered metal cans? If not, why?
   Answer:
   Remarks

3. Do you, personally, know that covers on such cans are kept closed?
   Answer:
   Remarks

4. How often is garbage removed from your premises?
   Answer:
   Remarks:

5. Do you or your neighbors throw garbage on vacant lots in your vicinity?
   Answer:
   Remarks:

6. Have you rat traps set?
   Answer:
   Remarks:

7. Have you put out poison?
   Answer:
   Remarks:

8. Have you provided rat proof receptacles for storing goods that you keep in the house?
   Answer:
   Remarks:

9. Have you been called upon by any Health Officer to inspect your premises?
   Answer:
   Remarks:

10. Have you succeeded in convincing your neighbors that San Francisco is facing a real danger, not only of a sanitary nature, but more particularly of a vital commercial and financial nature?
    Answer:
    Remarks:

We have a record of each of these inquiries to our employees and shall record the answers as received. The promptness and thoroughness with which the questions are answered will advise us to what extent our employees are co-operating with us to prevent an industrial and financial loss to yourselves as well as ourselves.

(Signed).....

TEN THOUSAND OF THESE INQUIRIES WERE DISTRIBUTED TO EMPLOYEES OF THE LARGER BUSINESS HOUSES.

GENERAL COMMITTEE

Homer S. King, Chairman
L. M. King, Secretary

E. H. Rixford — R. H. Swayne
Gustave Brenner — Capt. H. W. Goodall
T. C. Friedlander — James McNab
H. H. Sherwood — A. W. Scott, Jr.
Frank J. Symmes — L. M. King
Chas. C. Moore — Walter Macarthur
Harry M. Sherman, M. D. — John Gallwey, M. D.
Martin Regensburger, M. D. — Langley Porter, M. D.
John M. Williamson, M. D. — H. C. Moffitt, M. D.
George H. Evans, M. D. — P. M. Jones, M. D.
Charles G. Levison, M. D. — E. N. Ewer, M. D.
James H. Parkinson, M. D. — N. K. Foster, M. D.

CITIZENS HEALTH COMMITTEE

OF SAN FRANCISCO

EXECUTIVE COMMITTEE

CHAS. C. MOORE, CHAIRMAN
GUSTAVE BRENNER
WALTER MACARTHUR
GEO. H. EVANS, M. D.
FRANK J. SYMMES

HEADQUARTERS - 1233 MERCHANTS EXCHANGE BUILDING
TELEPHONE KEARNY 2183

SAN FRANCISCO, CAL.,

Important To Our Customers

Preservation of your business and the health of every person in San Francisco demand your instant and continued assistance in *exterminating RATS* and cleaning up the entire city.

The undersigned Associations are fully advised that a *quarantine* will be placed on the city *unless sanitary conditions* are made satisfactory to the federal government. Hence you are urged to give your personal attention to this matter.

Your business future depends upon the work you do to help the doctors.

San Francisco must be rid of rats within sixty days.

RATS SPREAD BUBONIC PLAGUE.

Fleas leave sick or dead rats and carry the plague to human beings.

Rats in San Francisco are infected with bubonic plague. There is no question about it, and every man, woman and child in the city must help the federal and city officials clean up.

Every line of trade must assist.

The Citizens Health Committee, advised by Dr. Rupert Blue of the United States Public Health and Marine Hospital Service, is directing the work.

GET BUSY and see that no open garbage cans are in your own or your neighbor's home or place of business. Don't leave food where rats can get it.

If quarantine is ordered you go out of business.

Enclosed are instructions prepared by the Health Committee and government inspectors.

Work, not complaints, is demanded. Notify Dr. Blue, 401 Fillmore Street; L. M. King, Secretary Citizens Health Committee, 1233 Merchants Exchange, or L. R. Levy, Secretary of the Beer Bottlers' Association, 524 Gough Street, of any insanitary condition in your neighborhood.

GET BUSY with rat traps and poison.

Make your scavenger do his work cleanly and often.

(Signed) BREWERS' PROTECTIVE ASSOCIATION.
S. F. BEER BOTTLERS' BOARD OF TRADE.
S. F. SODA WATER MANUFACTURERS' ASSOCIATION.
BOTTLERS' PROTECTIVE ASSOCIATION.

TEN THOUSAND OF THESE CIRCULARS WERE DISTRIBUTED TO THE SALOONS AND OTHERS OF THEIR TRADE BY THE ORGANIZATIONS SIGNING.

CITIZENS HEALTH COMMITTEE

To Parents:

You are invited to come to the.....

.....School at.....M.

on....., 1908, to hear an address by a representative of the Citizens Health Committee regarding the absolute necessity of following certain rules in living in order to prevent the further spread of Bubonic Plague in the city, and to avoid the danger of a quarantine.

OVER THIRTY THOUSAND OF THESE INVITATIONS TO PARENTS WENT OUT.

The Citizens' Health Committee suggests that employees limit their subscriptions to one day's pay.

CITIZENS' HEALTH COMMITTEE

1233 MERCHANTS' EXCHANGE BUILDING
SAN FRANCISCO

We, the undersigned, employees of

.....

hereby, subscribe the sums set opposite our respective names as a subscription toward the Citizens' Health Committee Fund, for the eradication of bubonic plague in San Francisco and in an effort to prevent the quarantining of the city.

This subscription is in addition to that made or to be made by our employers, and we hereby authorize the deduction of our subscription from wages due us.

NAME	AMOUNT	NAME	AMOUNT
	$		$

FIVE THOUSAND EMPLOYEES' SUBSCRIPTION BLANKS WERE DISTRIBUTED.
NOTE SUGGESTION OF LIMIT IN UPPER LEFT-HAND CORNER.

HAIGHT AND ASHBURY DISTRICT IMPROVEMENT CLUB.
HEALTH AND POLICE COMMITTEE.

HEALTH BULLETIN

TO THE RESIDENTS OF THE DISTRICT:

In view of the prevalence of the bubonic plague in San Francisco, and the fact of its spread through the agency of the **RAT,** it becomes the duty of every citizen to adopt measures to protect his home against a visitation of this disease.

Experience teaches that plague develops slowly but that when once firmly planted in a community it is the most difficult of all diseases to eradicate. Campaigns against this disease may last for years. In fact, reconstruction and extensive alterations in buildings may be necessary to insure protection.

Science has abundantly proven that plague is an epizootic of rats transmitted to man by the bites of fleas and contaminated clothing and food. It is further demonstrated that the surest and quickest way of eradicating the disease is to **Exterminate Rats** and other vermin. This may be done satisfactorily by the use of traps and poisons. Rats are wary, however, and when well supplied with food from other sources may not take poisons or enter traps.

Refuse of all kinds, such as **Kitchen and Stable Waste, Grain, Fruits and Vegetables** should be destroyed daily—in fact, any substance which might serve as food for rats should be carefully collected and placed in **Metal Garbage Cans with Tight-Fitting Covers.**

The food supply of the household should be protected by screens from the possible contamination of plague-sick rats. These pests enter homes in search of food through burrows and holes in the **Basements and Ground Floors.** The points of entrance and exit of the plumbing, if not close-fitting, furnish the means of ingress, as will also windows near the ground level, if not properly screened.

It is imperative, in order to protect the home against a visitation of this dread disease, to make **Every Building Rat-proof.** This can be best accomplished by cementing or concreting all foundations, or by closing every possible avenue of entrance to be found. Have your homes carefully examined without delay and call in the plumber, mason or carpenter, in the event that their services are required.

Bakeries, markets, restaurants, junk-shops, stables and granaries, on account of the great amount of food on hand, attract and sustain large numbers of rats. These places should be made impervious to the ingress of rats and scavenger insects at the earliest possible time.

A campaign of eradication is now being waged by the Federal, State and City health authorities and every citizen is earnestly urged to assist them by enforcing the sanitary regulations of the Health Department. **Material Aid,** of a high order of efficiency, can be rendered by every property owner and householder in the city. **Every Resident is therefore urged** to have all premises cleaned up, all rat-food, rat-runs and nesting places destroyed.

The task of destroying the rats of a large city is too expensive to be undertaken by the Health authorities alone. Householders should rid their premises of these pests by the use of poisons and traps without delay.

Respectfully,

RUPERT BLUE,

P. A. Surgeon, U. S. P. H. and M. H S.

Rat poison may be obtained gratis at the Health Department, O'Farrell Street near Scott.

BROWER-MORSE CO 136 FEAN AVENUE

MANY THOUSAND OF THESE CIRCULARS WERE PRINTED BY THE IMPROVEMENT CLUB WHOSE NAME APPEARS, AND DISTRIBUTED IN ITS DISTRICT.

THE PLAGUE.

TO THE PUBLIC:

The display of Rat Poison in this window and this notice results from a meeting of drug gists with the Citizens Health Committee, held at the Merchants' Exchange, Feb. 12, 1908, where the serious condition that confronts the City was made very plain.

The citizens of San Francisco must get to work cleaning up their premises. Everything possible must be done to exterminate the rats or our City will be quarantined because of the Plague.

Heed the warning of the Health Authorities. Though you may have business to attend to now, you certainly will have none to bother you should the City be quarantined.

Respectfully yours,

DRUGGISTS' COMMITTEE.

Monahan Print, 311 Battery St.

THOUSANDS OF THESE CARDS APPEARED IN DRUG-STORES ALL OVER THE CITY. THEY WERE PRINTED BY THE DRUGGISTS' SUB-COMMITTEE.

DANGER DANGER

IMPORTANT

Dear Sir:

You are hereby summoned to attend a meeting of the Bakery and Restaurant Men, to take place at the rooms of the

Chamber of Commerce, 13th Floor, Merchants' Exchange Bldg.

On Monday, February 17th, at 3 o'clock p. m.

It is absolutely necessary that you should come and hear what Dr. Blue has to say upon the subject of the Bubonic Plague.

The Bakeries and Restaurants of this town are going to be inspected and they have been declared by the Health Authorities to be the most dangerous methods of spreading the Plague. Those places that are in an unsanitary condition will be closed up and their names will be published in the daily papers by the Health Authorities. If this disease is not stopped before the summer comes, the City will be quarantined and this will hurt YOU so do not fail to be there on time whether you are a member of these associations or not.

THE ALLIED MASTER BAKERS' ASSOCIATION

THE AMALGAMATED RESTAURANT & HOTEL KEEPERS' ASSOCIATION

Office, 330 and 332 Pacific Building, cor. 4th and Market, San Francisco
Telephone, Douglas 979

THESE WERE DISTRIBUTED TO ALL THE RESTAURANTS AND BAKERIES IN THE CITY.

POST CONSPICUOUSLY

To the Cigar and Tobacco Trade.

CLEAN UP YOUR PREMISES

and see that others do likewise.

EXTERMINATE RATS and ALL VERMIN.

Report any Neglect in this line to Headquarters,
1233 Merchants Exchange Building.

The Citizens Health Committee realizes that while Conditions and Danger of Plague and Subsequent Quarantine have not changed for the worse, a great deal is due to WEATHER CONDITIONS, and the danger has by no means past, and it behooves EVERY citizen to do all he can to avert above mentioned Calamities. Therefore you are requested to lend your aid and constitute yourself a committee of one to see that ALL Health regulations are Strictly Enforced.

Yours truly,

Committee of Cigar & Tobacco Dealers

THIS WAS ONE OF THE BEST POSTERS PUBLISHED. IT APPEARED IN ALL THE CIGAR STANDS IN THE CITY.

SANITARY RULES.

Tack Up In Prominent Place.

First—Place one or more SANITARY IRON BARRELS in front of your premises and a sufficient number of sanitary iron barrels in rear of your place of business to fully accommodate all refuse you may have at any time. These garbage receptacles to be kept CLOSELY COVERED.

Second—Remove garbage daily.

Third—Keep store clean at all times, both inside and on the sidewalk.

Fourth—Gather up all vegetable matter, banana leaves, or other refuse in front of your premises to the middle of the street, whether the same came from your premises or was dropped there by outsiders.

Fifth—If you have a blind cellar to your store, cut an opening or openings in same, and **either use traps in catching or destroying all rats on your premises,** or request this Committee to have the proper authorities place traps and **destroy the rats therein.**

Sixth—If you have wooden sidewalks in front of your premises, have openings cut, if necessary, and have poison placed beneath the sidewalks to DESTROY ALL RATS THEREIN.

Seventh—**Place concentrated lye in all rat holes and runways around your premises.**

Eighth—Report to this Committee any violation of these rules by your neighbors or any persons in this district.

Ninth—Instruct your employees not to sweep or throw any dirt or refuse into the street, and request them to report all infringements of the above rules. Also to report any teamsters who feed horses on the street and who do not clean up the grain spilled from the feed bags or other feed receptacles.

JOHN G. WETMORE,
ROBT. K. MALCOLM,
E. DAVIS.

Committee.

PLACARD IN RED AND BLACK, 12X20 INCHES, POSTED THROUGHOUT THE PRODUCE AND COMMISSION DISTRICT.

Reprint from the California State Journal of Medicine, August, 1908.

THE UNDERLYING PRINCIPLES OF ANTI-PLAGUE MEASURES.*

By RUPERT BLUE, M. D.; P. A. Surgeon, U. S. P. H. and M. H. S., San Francisco.

In a previous paper the technic of a plague campaign was discussed. In this article it is proposed to deal with the reasons for the measures previously indicated.

If the basic principles affecting the spread of any disease among the lower animals and the mode of conveyance to man are well understood, the task of eradicating that disease consists simply in the logical application of this knowledge and the measures to be deduced therefrom. Prior to the discovery of the mosquito-transmission of yellow fever we could limit in some measure the spread of that disease but we did it at enormous expense of money and energy, for we were fighting in the dark. Since Reed's epoch-making discovery, the complete eradication of yellow fever has become a comparatively easy and inexpensive matter. While this is not wholly true of plague, for we still lack much knowledge of the disease, the simile is not badly taken, and it is hoped that a thorough discussion of the raison d'etre of anti-plague work may prove profitable to all of us. The two fundamental factors in the spread and continuance of plague are the rat and the flea. It is therefore apparent that the partial solution of the problem of the eradication of pest must lie in the

*Read before the Thirty-Eighth Annual Meeting of the State Society, Coronado, April, 1908.

study of the habits and life history of the animals and insects liable to have and to spread the disease, and the application of the facts acquired by such study. Let us first consider the rat.

We have found in San Francisco the mus decumanus, or large gray Norway rat; the mus rattus, or black Indian rat; the mus Alexandrus, or red rat, and the mus musculus, or common mouse. The following is the percentage of the different varieties:

Mus decumanus	80%
Mus rattus	6.8%
Mus Alexandrus	.2%
Mus musculus	13%

In addition to the above a few hybrids, a cross between the mus decumanus and mus rattus, have been found. Their number is so insignificant, however, that they need not be considered further.

It would be logical to expect that the chances of infection would be greatest in the mus decumanus on account of their overwhelming numbers and wide distribution, and this is found to be a fact, for only a few infected mus rattus have been discovered, and no infected mus Alexandrus or mus musculus. The mus decumanus is so much larger and fiercer and exists in such large numbers that there are only a few places in San Francisco where the mus rattus is found and the mus Alexandrus is rarely captured. The mus musculus lives in very small holes and does not come in open competition with the mus decumanus or else the mice would also be reduced to the minimum by the gray rat. I believe this condition of affairs exists in almost all American coast cities so the only rat to be considered, in an urban plague campaign, is the decumanus or Norway rat. In the country, especially in California, the animals to be taken into account are the

ground squirrel and the gopher, and to some extent the field rat.

We have found in our work that a rat-run usually branches like a Y. At one extremity of the fork is a little store-house in which may be found corn, wheat, pieces of bread and apple cores. At the other end is the nest made of rags and feathers laid on straw or hay and offering an ideal breeding place for fleas. This display of ingenuity and foresight gives us a clew to another characteristic of the rat, namely, his sagacity. There is no need to dwell on this point, which is well known to every one, further than to call attention to the fact that when man begins to fight the rat it is a battle between the intelligence of the one and the instinct of the other with the advantage not always on the side of the former. The rat is a subterranean animal by force of circumstances and leaves his home chiefly in search of food and water. In cities his great highway is the large sewer which also furnishes him with protection, food and drink. It is the migratory rat, traveling as a rule by way of the sewers, which spreads the infection of plague in this city. The mouse, a household animal, is non-migratory, and although some thousands have been examined, not one has been found infected. Measures, therefore, tending to prevent rat migrations by this and other routes should be undertaken with the least delay. The large brick and mortar sewers should be carefully inspected inside and out, and all holes and runs affording ingress and egress to rats should be sealed. Runways beneath board walks and under fences, which permit travel from house to house, should be destroyed.

The fecundity of the rat is proverbial and on account of the extreme rapidity with which rats will increase, their extermination by trapping and poisoning alone is a difficult and expensive process. While this means of extermination

is important it should never be attempted without a coincident abolition of the rats' food-supply and habitation. The former is accomplished by the rigid enforcement of ordinances covering the collection and disposal of garbage, the screening of all places where food is stored, the rat-proofing of restaurants, markets, stables, warehouses, and ground floors with concrete and cement, frequent sweeping of the streets and cleansing of all premises and vacant lots. It will be observed that cleansing in plague sanitation means the destruction of rat-food and rat-habitations. To accomplish the latter, it is necessary to search for rat evidences and rat harboring places in all premises. These will be found chiefly in and around stables having wooden floors and faulty manure bins and feed boxes, in fact, under any place of wooden foundations. The brick debris of the great fire and the lumber of the builders of San Francisco have furnished ideal breeding places for rats. Every place of human occupation must be rendered permanently rat-proof if the disease is to be eradicated for all time from the infected city. This is not the work of one season alone but should be made a continuous improvement enforced by strong building laws. In other words, the disease must be built out of existence. This is the hope of San Francisco and in time that city will be one block of concrete throughout, and the gateway to the Orient closed against plague.

The starved and homeless rat takes poisons and enters traps more readily and this brings us to the second phase of the subject; namely, trapping and poisoning. Rats are extremely wary animals and enough cannot be caught by inexperienced men to greatly reduce their numbers. It therefore becomes necessary to place intelligent men at this task and to train them carefully in their duties. A man can no more be made a rat-catcher by giving him a rat-trap than

he can become a soldier by being provided with a rifle. Those interested in the technic of rat-catching will find an article on the subject in the Public Health Reports for February 28, 1908. Poison, when used, should be intelligently placed so as to be inaccessible to children and domestic animals.

The rat-fleas found in India show a great preponderance of the pulex cheopis but in San Francisco the ceratophyllus fasciatus is in the majority. The percentage as we have observed it has been as follows:

Ceratophyllus fasciatus	79.2
Ctenopsylla musculi	6.7
Ctenocephalus canis	.8
Pulex irritans	7.6
Pulex cheopis	5.6

It should be borne in mind that these percentages are subject to great variation.

While exterminating the host, a great deal can be done to limit the number of the parasites. The rat nests, wherever they may be found, under wooden floors, in hollow walls, or in the yards, contain countless numbers of flea eggs. For my part I do not believe the rat-flea breeds to any great extent in the sand of the street and the vacant lot, but that his natural habitat is the nest of his normal host, where the eggs are deposited during summer and autumn. If nothing interferes these eggs hatch the following spring and summer and the adult flea attaches himself to his chosen host on the advent of the first warm weather. If these nests and burrows could be destroyed during the off season of plague, millions of possible plague-carriers would be eliminated. These nests should be uncovered and their contents burned. Flooding the holes with a strong carbolic acid solution, creofect, or chloronaptholium is also recommended as a reliable measure.

This is one of the reasons why we have torn up board walks, cellars, stable floors, backyard coverings, etc. The floors and carpets of theatres may be sprayed once or twice a week with some reliable insecticide. Such solutions often contain carbolic acid and may be objectionable on account of their odor. Carpets and rugs should be taken up and beaten in the open air and sunned at least twice in the flea season, between April first and September first.

The seasonal prevalence of plague is coincident with the season of greatest activity of the ceratophyllus fasciatus and pulex cheopis. The flea does not breed in the cold wet months and it is at this time that they are fewest upon the rats. Last January twenty rats were combed before a single flea could be found. By the first of February the average was two fleas per rat and this number gradually rose to 4.6 on March 1st and is now about ten per rat. Last September when the number of human plague cases was greatest the rats showed about thirty fleas each. Thus we see that human-plague prevalence is directly as rat-flea prevalence. In the face of this comes the apparently contradictory fact that plague among the rats was greatest when the number of fleas and the number of human cases was at the minimum. In winter the rats' food supply is at the lowest point and the cold wet weather makes them loath to leave their burrows in search of sustenance. It is then that they begin to eat one another and as the sick rat is least able to protect himself, he is the first to become a prey to the stronger members of his tribe, and those who partake of his infected tissues become in turn infected, thus spreading the disease in the geometrical ratio. In addition to this, the cold rats huddle together and if there be but a single flea present he may infect the entire number. We have here the explanation of an active epizootic of plague during the quiescent period of epidemic plague.

While plague may prevail among human beings in San Francisco throughout the year, its season of greatest prevalence begins in August and continues until the end of October. From January 30th to April 21st, although there was a large percentage of infection among rats captured in densely populated sections of the city, no case of human-plague occurred. In some districts the infection ran as high as 1½% of the rats examined. That epizootic plague is not always followed by epidemic plague was observed in Childers, a small town in Queensland, Australia. In 1905 nearly the whole rat population died off and only one human case occurred. In Cardiff (1901) a large rat mortality was accompanied by only one human case (Burnet Ham). There is one notable instance on record, namely, Glasgow, (1900) where epidemic plague was not preceded by a plague mortality among rats. This may be accounted for by the fact that rats often seek inaccessible places when sick, and unless a careful search is made in such places no cadavers will be found. This digression is simply to show, first, the need of exterminating rats in the winter when there are few fleas; second, of destroying their habitations in order to lessen the number of fleas as well as the number of rats.

Passing from the consideration of rodent-plague let us now take up human-plague and the way in which its various forms affect the problem of its eradication. On account of improved hygienic conditions, personal cleanliness, etc., human agencies do not play as important a rôle in the dissemination of plague in Occidental countries as in the Orient. We also know that human transference, except in the pneumonic form, is relatively infrequent among persons free from vermin. In the absence of the pneumonic and eruptive forms of the disease we may concentrate our forces on the destruction of the rodent and his parasites. The purely bubonic

form is practically non-contagious from man to man, and if there are no suctorial insects present the same may be said of the septicemic cases.

The pneumonic cases are very contagious. For the first two forms fumigation and disinfection are done to kill fleas and other vermin; in the latter, to kill the bacillus pestis as well. In the uncomplicated bubonic cases the aim is to destroy the original infecting agent and not something which the patient himself has created. This means that the place where the disease was contracted is to be subjected to thorough fumigation. It should not be forgotten, however, that a bubonic case may secondarily become septicemic or pneumonic, and for this reason should be kept under constant observation. All cases should therefore be removed to a hospital situated in a rat-proof compound.

The fumigation of buildings and sewers for the purpose of killing rats has proven a futile measure, as the rat has already provided a means of escape and is simply driven out. Agents for patent methods and proprietary disinfectants do not understand this principle and often propose costly schemes for the fumigation of buildings and sewers to kill rats.

Plague may appear in many forms, and for this reason the busy practitioner with very little time for microscopic work may overlook atypical cases. In order to rectify mistakes in diagnosis, experts should be employed as inspectors of the dead and no burial permitted without a certificate of inspection. The expert will order a postmortem examination in all doubtful cases, as experience shows that numbers of atypical pest cases come to necropsy under such diagnoses as typhoid fever, pneumonia, appendicitis, acute nephritis, meningitis and abcess of the internal organs.

The immunization of large numbers of the population has

yielded good results in India, and this protective measure would therefore seem to be indicated here. It is doubtful, however, if this will ever be practical in America. In a republic where many people object to such slight inconvenience as is caused by vaccination, few persons would submit to Haffkinization, which is sometimes followed by a severe reaction, and only protects for six months. Further, plague has not been sufficiently widespread to warrant the use of this measure.

If a plague campaign is to be successful in the broadest sense, it is necessary that the general public be educated as to the danger of plague, and the means of avoiding it. This is especially necessary in America, which has never experienced the frightful epidemics that have taken place in other parts of the world and the people do not realize what a menace plague is. A campaign of education is, therefore, one of the basic elements of success. The people must be approached in the easiest way and addressed in their own language. This means, reaching them through the improvement clubs, the neighborhood organizations, the church and special mass meetings. These meetings to be addressed by men capable of speaking on the subject and explaining in simple terms the means of spread and continuance of plague. This measure has been carried out with remarkably good results in San Francisco. The citizens have organized themselves into a sanitary committee and have given a tremendous impetus to this branch of the work.

Too much stress cannot be laid upon the necessity of having a trained force ready at all times to combat epidemic diseases. In San Francisco, as elsewhere, much valuable time was lost in training men to do ordinary labor necessary in all large sanitary operations. If the campaign had been begun with a force drilled and trained in the application of

sanitary measures and well disciplined in the execution of orders, the epidemic might have been checked in half the time. The time has come when we should have a standing sanitary corps of trained men ready to take the field against any epidemic disease. Such an organization would pay for itself many times over in the saving of human life and the prevention of expensive quarantine.

ISSUED AS A CIRCULAR.

HOW TO CATCH RATS

BY

W. C. RUCKER, PASSED ASSISTANT SURGEON, EXECUTIVE OFFICER, PLAGUE SUPPRESSIVE MEASURES IN SAN FRANCISCO, CALIFORNIA.

The following is a summary of a collection of essays written by the rat catchers in the employ of the United States Public Health and Marine-Hospital Service working in San Francisco, California. These men have demonstrated their knowledge of the subject by continuously large catches, and what is detailed here is the result of actual experience.

It is first to be remembered that the rat is a very wise animal and that the whole operation of trapping him is a test of wits between man and the rat.

Rats are to be **found** where there is an **abundant food-supply** for them. Therefore, the **best places** to **catch rats** are **slaughter houses, meat markets, chicken houses,** in and around **garbage cans** and **places where garbage is usually placed.** If the rat is **deprived** of this **food-supply** he will be attracted by the **bait** in the **trap** and thus enter it.

CAGE TRAPS

The large nineteen-inch French wire cage trap has given very good results where rats are plentiful. It should be made of stiff, heavy wire and well reinforced, as a large, strong rat will force his head between the wires of a weak trap and thus escape. **Before setting, the lever on the trap should be tested to see that it works properly.** The trap should be placed on a hard surface with the rear end a little higher than the entrance so that the trap will close promptly.

When setting the trap in the open it should be fastened to a board on which about an **inch of soft dirt has been spread. Place the trap where the rat usually goes for food** or in a **run-way** and **disturb the surroundings as little as possible.** It is sometimes well to place the trap near where there is **dripping water,** as the rats come there to drink. If the trap is set in **hay** or **straw** or **wood, it should be covered** (with the exception of the entrance) **with this material.** When this is not possible it should be **covered** with a piece of **sacking** or placed in a **dark corner** or **beneath the floors.** When setting the traps in the sewer, a dry place should be chosen.

The rat is more or less of an epicure; therefore, the **bait** should be **changed** at frequent intervals. Also, he should be given food which he is not in the habit of getting, for example: In a meat market, vegetables are the best bait, while in a location where vegetables are plentiful, fresh liver and fish heads or a little grain are best. The following may be suggested as **good bait** to be used: **Fish, fish heads, raw meat, cheese, smoked fish, fresh liver, cooked corn beef, fried bacon, pine nuts, apples, carrots** and **corn.** When trapping in chicken yards a small chick or duckling is remarkably good. When a large number of rats are caught in one trap, **search for the female and leave her alive in the trap,** as she may call in the young or the males. The **bait** should be **fastened** to the **inner side** of the **top** of the trap with a piece of fine wire, so that the first rat in cannot force the bait underneath the pan and thus prevent the entrance of other rats. **A few grains of barley should be scattered near the entrance** of the trap and a small piece of cheese or meat fastened to the pan with a piece of wire. It is often well to touch the pan with a feather which has been dipped in oil of anise or oil of rhodium. **Before leaving the trap, it should be smoked with a piece of burning newspaper** to kill

the smell of the human hands or rats which have been in it. Do not handle the trap after burning it out. When trapping in a neighborhood where rats are known to exist, the traps should not be moved for three or four days unless they have rats in them, as it is well for the rats to become accustomed to seeing them and thus careless about entering. **It is not wise to kill rats where they are caught,** as the squealing may frighten the other rats away.

SNAP TRAPS

Snap or spring traps are best for use in houses and stores, with the exception of fish and meat markets. **Snap traps** are best for use in **run-ways,** and **on beams** and **shelves.** It is sometimes well to disguise the trap by covering its floor with a little sawdust or dirt. They should be first tested to see that they work properly and that the staples are secure. New traps should be smoked or stained to render them an inconspicuous color.

The **bait** should consist of some firm material such as fried bacon or tough meat and should be tied on so that the rat will be obliged to pull on it, and thus spring the trap. The trap should be placed in a corner or close to the wall on a flat, hard surface so that the rat cannot spring it with his tail or by walking on it.

BARREL TRAPS

In warehouses and granaries large numbers of rats may frequently be trapped by using a barrel or garbage can having a metal top which is carefully balanced. Large pieces of **strong cheese** are placed in the **middle of the cover** and a **plank laid from the floor to the edge of the barrel.** The rat runs up the plank onto the smooth metallic lid, which tips, and the rat is precipitated into the barrel.

Send all rats caught to the nearest District Health Station, or telephone them and they will send for the rats and pay the bounty.

REPORT, IN PART, OF THE COMMITTEE OF THE SOCIETY OF SIGMA XI ON THE PLAGUE CONDITIONS IN BERKELEY, SAN FRANCISCO, AND OAKLAND.

Causes of the Plague.

It is proved beyond doubt that the cause of plague in human beings is the specific plague bacillus which can easily be identified in three ways: staining, inoculation, and culture. By the use of a dye the bacilli are made distinctly recognizable when seen under the microscope. Inoculation is the injection of some of these bacilli under the skin of a healthy animal, causing it to have the plague. A culture is obtained by placing bacilli on suitable food when they multiply into masses of a characteristic form.

The plague bacillus has been shown by the above methods to be present in human beings and in rats suffering from the plague in each epidemic of the plague since the discovery of the bacillus in 1894.

The plague bacillus has also been shown by the above methods to be present in the fleas of plague rats and the disease has been given to healthy animals by the bite of these fleas. The bacillus keeps alive and active in the flea for at least six or eight days and probably much longer.

There are three forms of the plague: bubonic, pneumonic, septicæmic. Swollen lymph glands, called buboes, occur in the bubonic form. The symptoms of the pneumonic form are much like those of lobular pneumonia, and the symptoms of the septicæmic form are like those of blood poisoning from other causes.

In the bubonic form of plague, which occurs in about 80 per cent of all human cases, glands lying just underneath the skin are swollen. This suggests that the bacillus has

entered the body through a break in the skin. It is almost certain that in these cases the bacillus has been injected by the bite of the flea.

It has been proved by a number of experts that the flea called Ceratophyllus fasciatus, which is a common rat flea in this region, bites human beings. It is this flea in which plague bacilli are found in San Francisco and Oakland.

It has also been proved that rat fleas, which are rarely found on men when plague is not present, are found in large numbers on men when plague is present.

Of two hundred and forty-six fleas taken from human beings in Bombay when there was no plague only one was a rat flea. But of thirty fleas taken from people in a house where plague-infected rats had been found and where there had been two cases of human plague, fourteen were rat fleas.

As long as the rats are alive fleas do not leave them for other animals, but when the rat dies and the body becomes cold, the fleas leave them for other warm-blooded animals, frequently men.

Before this fact was known so many of the rat catchers in some of the plague districts of India took the plague that rat catching was temporarily abandoned. But now that the fleas are killed at the same time as the rat, rat catchers are no more liable to have the plague than other persons.

In Agra, India, it was observed during four different outbreaks of the plague that soon after the fleas came, plague broke out, and that when the fleas disappeared, the plague also disappeared. This same relation between the appearance of the flea and the plague was also observed in Bombay, India, and in Sydney, New South Wales.

These facts, together with others that have been proved beyond any doubt, give most satisfactory evidence that the plague bacillus is carried from rat to man by the flea, though this is not the only method of transmission.

In the pneumonic form the sputum coughed up by the patient contains thousands of the plague bacilli. When the sputum has dried, the bacilli are free to float through the air like particles of dust and any one who breathes in some of these bacilli usually has the plague. This form of the plague, therefore, passes directly from man to man and is a most infectious and fatal form of the disease.

The climatic conditions in the Bay Cities, contrary to popular belief, are most favorable to the spread of the plague, as it thrives best in a temperature ranging from 56 degrees Fahrenheit to 75 degrees Fahrenheit.

Concerning the Actual Existence of Plague about the Bay.

The history of plague epidemic shows that the human cases are at first few in number, of a mild type, and with a low death-rate. After an interval of months or years, during which there may be no human cases, the disease again breaks out with an increased number of cases, greater severity of symptoms, and higher mortality. The disease seems to come and go in this way for a number of times, often ending in a severe epidemic causing thousands of deaths.

In England, where plague was present from 1348-1680, a striking example of this feature of the disease is found. Statistics show that in London in 1605 there were 444 deaths from the plague. The number increased each year till 1609, when there were 4,240 deaths from plague. During the next year there were only 1,803, and in the following year only 627 deaths. The number of deaths then fell to 64 and remained less than 100 a year for fourteen years, when in 1625 the number increased to 35,417. For the next ten years there were comparatively few cases, but in 1635 ten thousand four hundred died of the plague in London. For thirty years after this the pestilence gradually abated until in 1664

out of a total of 18,297 deaths in the city, only 6 were attributed to the plague. In 1665 the plague broke out again with increased violence and carried off 68,596 victims. After this, it rapidly disappeared and has not again visited that city.

The first verified cases of plague in man in the State of California came in 1900. During the next four years there were 125 cases. From 1904 to 1907, with the exception of three cases in Contra Costa County, there was no plague in California. Since May, 1907, there have been in the Bay Cities about 170 cases, with a death-rate of between 60 and 70 per cent. It is probable that unless a most active fight is kept up to get rid of the rats, there will be a large increase in the number of plague cases during the coming dry season.

Dr. Long states that since October 1, 1907, there have been twelve cases of plague in Oakland, and that there are now three cases under suspicion. Five of these were native Americans, seven foreign born: one French, one Swede, one Italian, one Portuguese, one Mexican, one Japanese, one Chinese. Nine of the cases were of the bubonic type, two of the septicæmic, and one of a mixed bubonic and pneumonic. All of the patients lived in fairly good surroundings and circumstances, one being the wife of a physician. Seven of them died—three Americans, one Japanese, one Chinese, one Mexican, one Italian.

These were known to be plague cases because:

1. All had the usual symptoms of the disease.

2. The plague bacillus was found in the body in each case.

3. In ten of the cases bacilli placed on culture media grew into such shaped masses as only this bacillus can form.

4. In these ten cases, the injection, under the skin of healthy guinea pigs, of some of the bacilli found in the bodies, caused the animals to die of plague.

The proof that these were plague cases was found by Dr. Long and by eight physicians assisting him, and was confirmed by the Oakland Board of Health and at the laboratory of the State Board of Health.

Dr. Long states that 1.2 per cent of all the rats caught and examined in Oakland since October 1, 1907, had the plague. The number of rats examined in the last ten days, February 22 to March 3, in Oakland was 775. Of these 26 or 3.4 per cent were infected with the plague.

During the plague epidemic at Manila, when there were fifty to sixty human cases every month, only 1 per cent of the rats were found to have the plague. The reason that there are no more cases of plague among the people of Oakland at the present time is attributed to the fact that at this season of the year the rats have so few fleas, on the average only one flea to six rats. During the flea season, which begins in June, the number of fleas found on a healthy rat increases to twenty-five or thirty, while as many as eighty-five are found on a sick rat.

The following report from the office of the United States Public Health and Marine Hospital Service shows that the increase of fleas in San Francisco has already begun.

Date 1908	Rats examined	Number having fleas	Total number of fleas	Average number of fleas per rat
January 22	3	2	5	1.6
January 24	10	6	8	.8
January 27	15	8	15	1.0
February 4	7	3	19	2.7
February 6	5	4	17	3.5
February 12	19	16	118	6.2
February 14	20	12	152	7.5
February 17	21	21	212	10.0

February 6 to 17, dry weather.

The human plague cases in Oakland were found in the places where infected rats were caught. It is proved, in this, as in other epidemics, that plague-infected rats are usually found in a district before human cases appear there.

The rats caught are carefully examined by trained men to find whether or not they have the plague. The disease is proved to be present by finding the following conditions:

1. Hæmorrhage of skin and intestine.
2. Swollen glands.
3. Enlargement of the spleen and degeneration of the organ in spots.
4. Spots of degeneration in the liver.
5. Pleural effusions.
6. Finding of the plague bacillus in microscopic preparation from the liver and spleen.
7. Cultures.
8. Inoculation.

In each case where these conditions are found two or more physicians make separate examinations.

In San Francisco on February 29, 1908, there were no cases of the plague in man and but one suspected case. Of the two thousand rats caught that day, fourteen had the plague. The methods of finding the disease in the rats are the same in San Francisco as in Oakland. The total number of cases of human plague in San Francisco since May 23, 1907, is 159; the number of deaths, 75. About 60 per cent of these were native-born Californians, and only 5 per cent were Orientals.

After a careful study of the problems and methods involved in an effectual fight against the plague, your Committee feels that it can be carried on successfully only by trained men, and that no police force is competent to do this work.

England, which has fought the plague most successfully in its colonies, keeps a permanent staff of trained men in plague districts, even when no plague is present. These men carry on a continual warfare against rats and, if plague does break out, serious epidemics are prevented by their prompt and efficient work.

Respectfully submitted.

Signed by the special Sub-committee of Investigation:

Jacques Loeb, M. D., Physiology,
Charles Gilman Hyde, Sanitary Engineering,
Charles A. Kofoid, Zoology,
W. C. Morgan, Chemistry,
A. R. Ward, Bacteriology,
E. von Knaffl-Lenz, M. D., Pathology,
Robert O. Moody, M. D., Anatomy, *Chairman.*

Approved by the Committee on the Plague Situation:

Irving Stringham,
A. C. Lawson,
Jacques Loeb, M. D.,
G. F. Reinhardt, M. D.,
A. R. Ward,
J. C. Merriam,
R. O. Moody, M. D.,
W. E. Ritter,
Charles A. Kofoid,
W. C. Morgan,
Charles Gilman Hyde, *Chairman.*

Adopted by the Society,
Berkeley, March 4, 1908.

Reprinted from the Journal of the American Medical Association, February 1, 1908, Vol. I, pp. 327-329.

Copyright, 1908.

American Medical Association, 103 Dearborn Ave., Chicago.

THE CONDUCT OF A PLAGUE CAMPAIGN.*

RUPERT BLUE, M. D.

Passed Assistant Surgeon in the United States Public Health and Marine-Hospital Service.

SAN FRANCISCO.

In a brief paper intended merely to enumerate the eradicative measures in operation in San Francisco, I shall not touch on the economic importance of the problem to the city, state and nation. In this connection it should be mentioned that plague is considered by some epidemiologists as the most difficult of all diseases to eradicate; indeed, there are those who maintain that where the infection has once taken root, the disease never dies out entirely. The success which crowned the efforts of the health authorities of Oporto in 1899, Glasgow in 1901, Naples in 1903, and San Francisco in 1903 and 1904, renders this theory untenable. Let no one be discouraged by these prophecies of evil, but let him remember that whenever organized bodies, having the cooperation of the people, have taken the field the disease has been vanquished.

To be successful, the campaign of eradication must be based on a knowledge of the etiology, mode of transmission and the causes of the continuance of the disease. First of

*Read before the San Francisco Academy of Medicine, Nov. 26, 1907.

all, the campaign should be conducted by a trained corps of medical men having few local affiliations or prejudices, able to devote their entire time to the work, and backed by the strong arm of the government. No matter how earnest and conscientious the local authorities may be in the discharge of their duties, their plans of operation do not always meet with that acceptance and approbation which is accorded an outsider. Personal and political differences often arise to hamper the best efforts of an honest and capable board of health, and often render futile the plans which would have ensured a successful issue. Given a special plague department, heartily backed by the local authorities, and the people they represent, provide them with sufficient funds and power to act, and the stamping out of the disease is almost certain.

The duties of this department, briefly summarized are: The location and determination of plague cases, both human and rodent; the tracing of the source of infection in each case, and the destruction of the infecting agents. The destruction of rat habitations as far as possible; the abolition of the means of rat sustenance; and the protection of all places of human residence against the ingress of rodents.

To expand on these basic principles: First, the location and determination of plague cases both human and rodent. This entails a careful examination of all dead bodies, the examination of all sick persons, and the isolation and observation of all suspicious cases and contacts. For this purpose inspectors of the dead should be appointed, and no corpse removed or buried until it has been viewed by an inspector and a permit issued. Bodies of persons dying of plague should be cremated or buried in metal coffins with quick lime. The local practitioners should report all cases coming under their observation which in any way resemble plague. Whenever any doubt exists as to the diagnosis,

skilled diagnosticians from the plague department should be called. In addition, whenever a person is found sick on the sanitary survey, the diagnosis should be determined by the officer in charge of the district, either by a visit to the attending physician or by consultation with him, should this be considered necessary.

The city should be divided into districts and a trained medical man placed in charge of each district. He should establish a centrally located and convenient headquarters, and should be given men and supplies sufficient for the conduct of the work. His first duty is to make a rapid sanitary recognizance of his district, employing for this purpose sanitary inspectors who report on the street and number of each house, the number of persons residing therein, the sanitary condition of the premises and the occurrence of sickness in the two months prior to the epidemic. Special attention should be given to stables, bakeries, markets and junkshops, it being borne in mind constantly that the prime object of the campaign is the destruction of the rat and his parasites. If domestic animals have died with any of the symptoms of plague, or if there is an unusual prevalence of suctorial insects, such as fleas or bed bugs, it should be noted, and the house treated with some insecticide. The reports of the sanitary survey should be filed in a suitable card index so that information as to the sanitary condition of all premises in the district is available at a moment's notice. In addition, a map showing the occurrence of human and rat plague should be kept so that the medical officer in charge of the district may know where to concentrate the efforts of himself and his men.

In plague times any patient with the symptoms of an acute infection of any kind, such as chill, headache, backache and rise of temperature, should be kept under observa-

tion until the diagnosis is clear and plague can be excluded. All cases of plague, or disease resembling it, should be isolated carefully in a rat-proof compound, and persons who have come in contact with such cases kept under observation for the full period of incubation. It is advisable, especially if the case is of the pneumonic type, to administer an immunizing dose (10 c.c.) of Yersin's serum to each person exposed to the infection. In uncomplicated bubonic cases recourse to this method is not considered necessary as the probability of infection from exposure to such cases is remote. Haffkine's prophylactic should not be administered to contacts on account of the negative phase which it induces, thereby greatly endangering the contact's chances of recovery, provided he already has the disease.

The destruction of the infecting agents may be accomplished by the fumigation and disinfection of the infected house, for the purpose of destroying suctorial insects and surface bacteria. After careful sealing of the rooms, to prevent the escape of gas, fumigation should be performed with sulphur, in the proportion of five pounds to the thousand cubic feet of initial air space. Twelve hours exposure should be given. Formaldehyd does not kill insects or other vermin, and therefore should not be used. Bedding, old clothing and other articles contaminated with the excretions of the patient should be destroyed by burning. The carpets should be removed and beaten, the house swept and the sweepings burned, and the floors washed down with an active antiseptic solution. The yard should be well sprinkled with a strong carbolic solution, and the outbuildings thoroughly limed to inhibit rats, fleas and scavenger insects.

The following excerpt from the instructions issued to medical officers in the field outlines the routine measures for plague infected localities:

Upon the occurrence of a case of plague in a block, and when the infection is thought to have been contracted in that locality, concentrate a sufficient force to carry out, in as short a time as possible, the following measures in addition to the disinfection of the infected house.

1. A rapid sanitary survey of the infected and contiguous blocks. (a) Note the cases of sickness at the time and for the past six weeks in each house; (b) number of stables, their condition as to sewer connections, character of flooring, number of stalls, and the meat markets and bakeries for the same conditions; (c) sanitary condition of occupied premies and vacant lots with regard to rat food and harboring places; (d) note the prevalence of rats, and especially if dead rats have been seen recently. The inspector will enter every house in search of this information and impress on householders the necessity of destroying rats and rat-food, and of making their homes rat-proof. If a case of plague has gone unrecognized in the family, as shown by the sanitary history of the house, the facts should at once be reported to headquarters.

2. The rat-holes and runs in the infected and adjoining houses should be flooded with carbolic solution (1 to 40) or bichloride of mercury solution (1 to 500) and then treated as follows: Holes in wooden floors to be sealed with tin or sheet metal; brick or concrete, with cement; earthen holes to be filled with broken glass and brick.

3. (a) Place poisons, preferably phosphorus and arsenic pastes, in holes and runs in the infected and contiguous blocks; (b) place traps, both spring and cage, over the same ground. (c) Danysz' virus of high virulence should be placed in cellars, kitchens and households generally.

Depopulation of infected sections with the destruction of infected buildings has succeeded in several instances in the

present epidemic in stopping the march of the disease. This applies particularly to the irregular camps in the North Beach and Lobos Square districts. In dark, damp places, without adequate means of ventilation, alterations should be made to correct these insanitary evils. Lime-washing is an old but effective measure, and may be applied by spray pumps or brushes.

When plague continues to manifest itself in a house, or a locality after a thorough disinfection has been done, make a careful search in the neighborhood for the cause of the continuance. All harboring places and places in which rat-food is found in abundance should be looked on with suspicion. Defective wooden floors, and walls of the infected house and the adjoining houses may be torn out and a search made for rat cadavers. Stables and restaurants may be treated in a like manner. In 1903, 87 dead rats were found in the walls of a Chinese restaurant. Eleven rats showed plague infection. After the destruction of this focus no further cases occurred.

"When plague has once occurred in a house there is a great tendency in subsequent years for the same house, or that adjoining, or that on the opposite side to be attacked with plague" (Simpson). This may be accounted for by the lack of protection against the ingress of rats. Such houses on inspection will show rat-holes, burrows and free entrances in the basements, and refuge-places in the ceilings and walls. Obliterate them and plague will not reappear.

It is a curious fact that the morbidity and mortality rate from plague in rats is frequently low. This fact probably assists in keeping the disease alive, for if it spread rapidly among the rats they would soon be exterminated and the chief source of infection to human beings would cease. Under the closest observation during the Hong Kong epidemic only

7 per cent of the rats examined had plague, while in the present epidemic in San Francisco the percentage has been found to be less than one per cent. The disease also exists in chronic forms in rats, the bacteria being encapsulated in the viscera and cervical and inguinal glands. The service laboratory in Chinatown, during the previous epidemic, demonstrated the virulence of the organisms recovered from the bodies of such rats. These rats were found alive, emaciated to be sure, but still ambulatory foci for the spread of the infection. This, in my opinion, is one of the principal causes of the continuance of the disease and the long intermissions between cases.

The connection between rats and human plague is a matter of ancient observation and is recorded in the literature of the Assyrians, Hebrews, Egyptians and Greeks. The researches of modern times have confirmed these observations, and a great deal has been added to the literature of the rat, especially in relation to plague. Three varieties have been found in San Francisco: Mus decumanus, the so-called Norway rat, is the most common; M. rattus, the black rat, is less frequent, while a sub-variety, M. alexandrinus, is still rarer; M. musculus, the common mouse, is very numerous.

Types of the disease in rats: "In Hong Kong (second epidemic), the blood showed the organism (septicemic), in 100 per cent; spleen, 92 per cent; lungs, 38 per cent; intestinal contents, 33 per cent; urine, 16 per cent; mucus of mouth, 22 per cent; in all cases examined" (Simpson). These figures illustrate the dangers to be apprehended from the entrance of plague-sick rats into a house, and explain how infections of the lungs and alimentary canal may ensue from breathing or eating the dried excretions of the animal. The flea, while an important factor in the dissemination of infection, is not the only one to be reckoned with in eradicating the disease.

This knowledge suggests several important measures in plague eradication; namely: 1. All houses should be made rat-proof. 2. The screening and protection of food. 3. Disinfection of infected houses to destroy bacteria as well as suctorial and scavenger insects.

In a study of 310 human cases in Hong Kong there were: Bubonic, 55 per cent, divided into femoral, 35.4 per cent; axillary, 21 per cent, and inguinal, 0.6 per cent; septicemic, 40 per cent; pneumonic, 4.1 per cent (Simpson). The large number of septicemic cases, showing mesenteric and retroperitoneal glandular involvement, would indicate infection through the alimentary canal by contaminated food.

The fact is often overlooked that it is as important to find and eradicate plague infection among rats as it is among human beings. Careful search, then, should be made for the cadavers of rats during plague times. Those that have died recently should be sent in for bacteriologic examination; bodies in which putrefaction has occurred should be burned. The measures that should be adopted to stamp out rat-plague are the same as those recommended for human plague. Every rat focus should be considered as a possible human focus, and the most active measures instituted immediately on its discovery. Rat contacts should be kept under observation and inspected daily for a period of seven days.

All defective buildings in which rats dead of plague have been found should be vacated at once to prevent the occurrence of the disease among human beings. The same rule applies to adjoining houses. Buildings in which plague continues to appear, in spite of the measures enumerated above, should be vacated and destroyed. These rules are in addition to careful general sanitation, the disinfection of infected houses, and the isolation of those sick of the disease.

Of the means employed in San Francisco for the destruc-

tion of the rat, trapping and poisoning on a large scale are chiefly relied on. Two varieties of traps are used, the cage and the spring, or snap-traps. These are apportioned between the laborers, one of whom cares for from 30 to 40 traps in a forenoon, the afternoon being used in placing poisons. Cheese, bacon, fish, sausage, green fruits and vegetables are used for bait. The poisons used have included plaster-of-Paris flour, phosphorus and arsenic pastes. The latter two are the most reliable. The pastes are made by heating together cheese, lard or suet, rye flour and sugar and incorporating the poisonous element while the mass is cooling. During the Chinatown epidemic (1903), exalted cultures of Danysz' virus were used with great success. Fifty per cent of the rats trapped alive and quarantined in the laboratory died of the disease, and the Bacillus typhi murium was recovered from their spleens and other organs. On account of rapid deterioration Danysz' virus should be distributed at frequent intervals.

As previously stated, all rat food and harboring places should be destroyed. The city should be given a thorough cleaning, the piles of débris removed and lumber piled two feet above ground. All places of human residence should be made rat-proof by the concreting of basements, the screening of all windows and entrances near the ground level, and the careful fitting of plumbing to the holes through which it enters and leaves the house. Stables and markets are a great menace. All stables should be concreted, connected with sewers, have proper manure boxes and metal-lined containers for feed and grain. The stable which does not conform to the above should be condemned and vacated. Warehouses should be similarly rat-proofed and the articles stored therein protected against the lodgment of rats.

In view of the danger of the shipment of infected rats in

freight, the wharves and piers should be constructed of stone or concrete and all goods stored thereon placed on platforms elevated from one to two feet above the floor level. Long piers extending into the harbor of a city in which plague prevails should be protected by a drawbridge which can be elevated at night. A less expensive arrangement for the accumulation and temporary storage of cargoes could be made by sectioning off a part of a wharf by rat-proof fences and placing suitable guards on the ceilings, girders and rafters.

There can be no doubt that rats and similar vermin mechanically transfer other diseases from the sewers to human dwellings. Therefore, I would recommend the rat-proofing of sewers. Wherever possible, the old brick and mortar sewer should be replaced by concrete, metal or vitrified clay sewers of proper diameter. The junction of the soil pipe and the main is the weakest point and one brick out of place in this locality forms a point of ingress and egress for the sewer rat who gorges himself with all manner of filth and pollution to return and disseminate the disease germs to man. To prevent stagnation of contents, the sewers should be flushed frequently. This also washes out large numbers of dead rats that have died of plague and may infect their kindred which are liable to feed on these carcasses.

Other infections of the rat are: Trematodes, or flukes; cestodes, or tape worms; nematodes, or round worms; protozoa, or trypanosomes; insects and vegetable microbes. Of the rats examined in San Francisco, 34 per cent are infested with tape worms; 25 per cent with trypanosomes, and 65 per cent with nematodes, and the Tricocephalus dispar (Lloyd).

Little has been said of the rôle of the flea in the transmission of plague. While this insect bears an important relation to the transference of the disease, it is not the only factor,

and if we destroy the host there is no longer danger of infecting the parasite. I have, therefore, used the short time at my disposal in dealing with what seems to me to be the more important elements in the problem of eradicating plague.

THE ELKS' LETTER

CITIZENS HEALTH COMMITTEE

OF SAN FRANCISCO

Headquarters - 1233 Merchants Exchange Building
Telephones Kearny 2183 and Douglas 1533

Dear Sir:—

The following is a copy of a circular letter issued to all its members by,

San Francisco Lodge, No. 3 Benevolent and Protective Order of Elks

This committee considers it so excellent, so much to the point, and the advice and information it conveys so valuable, that by courtesy of the Lodge we reprint this and ask for it **YOUR MOST THOUGHTFUL STUDY** and consideration.

CITIZENS HEALTH COMMITTEE.

HOMER S. KING, Chairman.

L. M. KING, Secretary.

IMPORTANT

THE PRESENT SITUATION IN SAN FRANCISCO AS REGARDS ITS SANITARY CONDITIONS

San Francisco, March 9, 1908.

Dear Sir and Brother:

Your earnest attention is called to the following facts relative to the present insanitary condition of our city:

1—Our city is in danger of having an epidemic of the plague.

2—The danger lies in the unprecedented increase in the number of RATS in San Francisco.

3—The rat is one of the MAIN causes of the spread of the PLAGUE.

4—The flea alights on the rat—the rat becomes infected—the rat dies—as soon as the body of the rat becomes cold, the flea seeks another warm body, and being NO respecter of persons or anything else, may alight upon you or some one dear to you, or it might alight upon another rat.

5—From reliable information received, many infected rats have been caught in some of our largest markets, as follows:

In one market 7 rats were caught and, upon examination, all 7 were found to be infected with bubonic plague; in another 9 rats caught, and the whole lot were found infected;

In still another 3 were caught, with the same result as above noted.

6—The rat finds its food from garbage and swill that are placed in insecure or leaking or open receptacles or barrels or is thrown in vacant lots, handily adjoining a residence.

7—UNLESS THESE CONDITIONS ARE CHANGED, SAN FRANCISCO MAY BE QUARANTINED BY ORDER OF THE FEDERAL GOVERNMENT.

WHAT QUARANTINE MEANS TO SAN FRANCISCO

1—No person can leave the city while the quarantine is in force.

2—No person can enter the city while the quarantine is in force.

3—After quarantine is declared off by the Government, it will be years before any can leave San Francisco with any degree of comfort, all being looked upon as dangerous, having come from a plague-stricken city, and in many cases being shunned as unclean things.

4—ALL stores will be CLOSED by order of the Federal Government.

5—ALL food, having been first inspected, will be given to you by the Health Officers, the quantity of food given being the regular ARMY RATION.

6—In the distribution of food, lines will be formed and EVERY PERSON takes his turn.

THE AWFUL DAYS OF APRIL, 1906, WILL BE AS HEAVEN COMPARED TO HELL, SHOULD OUR CITY BE QUARANTINED.

AVOID ALL THIS TROUBLE BY KEEPING CLEAN HOUSE, AND COMPELLING YOUR NEIGHBOR TO KEEP CLEAN HOUSE WITH YOU.

THE PERCENTAGE OF DEATHS IN SAN FRANCISCO FROM BUBONIC PLAGUE DURING THE PAST YEAR IS 65 PER CENT; THE OTHER 35 PER CENT WAS SAVED ONLY BY THE MOST CAREFUL MEDICAL ATTENTION AND CONSTANT NURSING.

WHAT BUBONIC PLAGUE MEANS

1—From all past history of the plague, the most robust person is just as apt to take it as the most sickly.

2—In India, where there is a religious feeling against the destruction or killing of any animal or insect, the plague takes from 250,000 to 1,000,000 people a YEAR.

3—It means awful suffering, not alone to yourself, but to those near and dear to you.

HOW TO DO YOUR SHARE TOWARDS STAMPING OUT THE MAIN CAUSE OF THIS FEARFUL PLAGUE.

A—See that your garbage barrel is absolutely tight in every way. IF IT LEAKS OR THE COVER DOES NOT FIT, GET A NEW ONE.

B—If there are any rats about or in your basement, poison them, or buy a rat trap and catch them; kill them by drowning, and SEND THE BODIES TO THE HEALTH DEPARTMENT, 401 FILLMORE STREET.

C—If one trap won't do the work, GET TWO OR THREE OR FOUR. It's better to spend $5.00 or $10.00 NOW than $1000 when it's too late.

D—Watch your neighbors, and if you see anything that isn't right, REPORT IT TO THIS OFFICE IMMEDIATELY. All such reports will be considered as strictly confidential and will receive IMMEDIATE attention.

E—Organize, if possible, in the square block in which you live, A CLEANING CLUB, and make it the business of the club to see that EVERY house in that square is in absolutely clean condition, as regards garbage, garbage receptacles, and the house itself. Have a member of the club visit the houses every week and see that sanitary conditions are lived up to, reporting to this office any delinquencies.

F—Your neighbors' cleanliness affects you as much as your own; DON'T OVERLOOK OR FORGET THIS IMPORTANT FACT.

G—You are requested to give this circular your earnest and careful consideration; don't throw it to one side and say "It isn't as bad as they make it"; if the situation in San Francisco was not a serious one, and one that required concerted action, in which ALL must do their little mite, your officers would not send this circular.

A Short History of the Plague and Plague Conditions.

(Part of the Elks' Letter.)

By Brother MAJOR C. F. KIEFFER, U. S. Army Medical Corps.

There are several prevailing misconceptions about the disease known as "The Plague"; probably the most common and certainly the most widely spread in this country is, that plague naturally is a disease of tropical countries. That is true to-day as it is true also of leprosy, simply because the people of temperate climates have advanced much more rapidly in the application of the sanitary sciences and have crowded both of these diseases out.

In the Middle Ages leprosy and plague were as prevalent, or even more so, in the temperate countries of Europe as they are in any tropical country to-day. The great epidemic known as the plague of Justinian, which is the first European epidemic which is recorded with sufficient accuracy to enable us to identify the disease with certainty, began in the year 542, entering by way of Egypt, and raged throughout the whole of what was then known as the Roman Empire, for sixty years.

This epidemic caused the most frightful havoc, depopulated cities and turned fertile countries into solitary wildernesses.

From that time on, at regular intervals, the disease swept over Europe until its last great appearance in England in 1679, Constantinople in 1841, and various provinces of Russia in 1879.

But now, like leprosy, it has been driven from Europe by the improved sanitary conditions which came in the train of advancing civilization.

The disease has only been imported into the Americas in comparatively recent years, the first recognized cases occurring in Brazil and Argentine.

It is therefore an error to say that the disease is at home only in the tropics and that it can not propagate widely in this climate. Any theory based on that idea is wrong, and may lead to most disastrous results.

The history of the disease shows that it CAN and DOES propagate in climates such as this, but it also shows that it can be controlled by PROPER sanitation.

All observations seem to indicate that in the province of Yunnan, in China, and in one or two points in Northern India, plague has existed as a permanent disease for many years. It has its home there and has been what we call endemic or permanent in these places.

From these points, about fourteen years ago, the disease began slowly but surely to spread, and in the intervening time, following the routes of trade, it has appeared in most of the tropical and many of the temperate seaports of the world. The reasons for and the conditions governing this world-wide spread, we do not as yet understand.

Now, the history of plague has always been that it smoulders along in any given place for very variable periods of time, which may extend over years. Then, without warning, comes the violent flare-up and the rapid spread of the disease, attended by the most appalling mortality.

Your city to-day is in that smouldering stage. Whether the flare-up will come here, no one can predict with certainty. The most that any one can say to you is, that there is a strong probability of such a thing happening.

Now is the time to wipe out the mine over which you are living. Looking at it this way, are you justified in omitting one single precaution which will help exterminate these con-

ditions? Are you justified in taking gamblers' chances with your life, with the lives of your family and your friends, with the very life and prosperity of your community?

On one side a little work on your part and loyal support and co-operation with the sanitary officers of the Government and City, who are willing to do the work for you; on the other side the possibility, indeed, the probability, of an epidemic of this disease which may bring painful and horrible death into your city and your homes, and which would be a calamity beside which the disaster of 1906 would pale into insignificance.

That, after all, was but the burning up of your temporal goods, while the fuel which would feed the flames of the epidemic would be the bodies of your friends, of your loved ones, of your fellow citizens.

Here you have the conditions of the game and the odds; on which side will any sane man play?

Plague attacks not only man, but in varying degrees of intensity is found in many of the lower animals. Of all these, the rat is the most sinister figure. The association between epidemic plague among rats and the subsequent spread of the disease among human beings is one of the oldest recorded facts of medical history. The true mechanism of the transfer of the disease from rat to man has only recently been solved. You are all now familiar with the proven fact that the transfer is effected by direct inoculation from a flea which has fed on the blood of an infected rat, and has in consequence itself become infected.

The flea, like the mosquito, when it bites, before sucking the blood of its victim, injects some of its saliva. This saliva is very irritating, and its purpose is to draw more blood to the bitten part, and thus make an easier and more ample blood meal.

Now reflect for a moment on the possibilities of the situation if the flea happens to be infected. When he injects his poisoned saliva into the skin, the conditions are almost as perfect as though one were deliberately to inject a small quantity of the culture of the plague germ with a hypodermic syringe.

Man may also become infected by eating contaminated food, meat, or vegetables at which infected rats have gnawed, or over which they have crawled, or, perhaps, voided their contagious excrement or urine. Knowing these facts, will you rest in fancied security, when you are told that infected rats have been caught in some of your best butcher shops? Can you not see that the infection may lie very close to your own table?

The chief danger of the rat, however, lies in the fact that he is the depository for infection in a community. When a city goes for months without a case of human plague, where is the contagion stored so as to start anew? In the diseased rats.

When human cases are quarantined and isolated in the strictest fashion, so that the disease can not spread from man to man, where do the cases come from? From the infected rats. It is for these reasons that the maximum of all our efforts at plague eradication is directed against this animal. It may be set down as an axiom, "No rats, no plague." Once they are destroyed or kept far from human contact, or contact with human food, then we have removed the spring head which is constantly renewing the infection and repoisoning the community.

Then the ordinary means of segregation of the human sick will suffice speedily to blot out the disease.

Therefore I plead with you to aid in every manner the work of rat destruction. Let each man do his part in keep-

ing rats from his own territory and securing his food supply against them. Do not, I beg of you, belittle this crusade. Do not do what is just as bad, approach it in a spirit of jest or trifling, as though you were to say: "This is a foolish thing for grown men to take up their time with, but we will do it to humor these faddy Federal officers, so that they will not quarantine our city."

I know many of the rules and regulations will appear to you trivial, and many of them even foolish. But remember that they have been drawn up by men whose whole life has been given up to the study of these problems, and that they represent an experience which has been bought and paid for in the tears and sufferings and death of myriads of victims.

I do not desire to pile horror on horror with the idea of stampeding you into proper plague precautions. God knows a bald recital of facts is enough for a thinking man. The effort is to present to you a conservative estimate of the possibilities of the situation and to show you that, if the measures with which you are being familiarized are followed, the disease CAN BE CHECKED.

We succeeded in stamping it out in Manila by following just these measures. And surely if it could be done there, can you doubt of the certainty of success here in an intelligent and progressive community, blessed with a good climate and advanced as it is in civilization?

The thing to do, brothers, is to GET TOGETHER; COOPERATE WITH THE HEALTH OFFICERS; LEND THEM YOUR MORAL SUPPORT AS FREELY AS YOU HAVE YOUR MATERIAL AID, AND, ABOVE ALL, DO YOUR PART IN SUPPRESSING THE SCOFFER, THE MAN WHO LAUGHS IN HIS IGNORANCE, AND WHO IN THAT IGNORANCE WANTS TO TRIFLE WITH A SITUATION LIKE THIS.

Remember, in these matters each one of us is in a measure his brother's keeper, and let us show this man that if he is not willing to do his part, we are not only willing to do ours, but we are going to see that he does his, WHETHER HE WANTS TO OR NOT.

This circular is not intended to scare you in any way; it is issued with the intention of trying to make you realize that you are in danger and that those you love and hold dear are also in danger, and that it can be averted by a little timely work on your part.

Your officers have used plain English in this circular, doing away entirely with technical terms of any kind; it is sent to you with the hope that you will realize the awful and serious condition of things and act in accordance with the requests contained in this circular.

Please remember that this circular is for YOUR own use, and is not to be thrown to one side where people may obtain possession of it; it is an official communication and MUST be treated as such.

Sincerely and fraternally yours,

WM. M. ABBOTT,
Exalted Ruler.

By HERMAN KOHN,
Secretary.

NOTE—Our Committee can add nothing to this letter; we only urge its earnest consideration.

CITIZENS' HEALTH COMMITTEE.

RODENTS IN RELATION TO THE TRANSMISSION OF BUBONIC PLAGUE.

By P. A. Surgeon RUPERT BLUE, U. S. P. H. & M. H. S.

Man has associated the rat with bubonic plague since the dawn of history. The monuments and coins of the earliest times yield abundant evidence of this association. Aesculapius, the god of the healing art, is represented by the Greeks with a rat on his feet. An early Scriptural reference may be found in the first book of Samuel in the fifth and sixth chapters. The historian records therein the occurrence of a fatal epidemic of "emerods" in the land of the Philistines coincident with an invasion of "mice."

The inhabitants of Southern China in recent times have learned to look upon the finding of sick and dead rats in their homes as a harbinger of evil, in fact, as a forerunner of that dreaded scourge, "wan-yick," or plague. In the villages and cities of the Kwantung and Kwangsi provinces, as recorded by medical missionaries, epizootic plague almost invariably precedes an outbreak among human beings. So well is this fact known to the common people that many seek safety in flight, feeling assured that in a short time "yang-tzu" or "wan-yick" will claim a harvest of victims among those who remain.

Dr. Mahe, sanitary officer for the port of Constantinople, in 1889, called attention to the fact that epidemics of plague were always announced by a great mortality among rats and mice. In 1894 Yersin reported the fatal epizootic among rats then prevailing in Canton and Hong Kong coincident

with the outbreak of plague among the Chinese. Recent researches have confirmed these observations and a great deal has been added to the literature of plague, especially in relation to its mode of transmission. Indeed, it should be said that wherever the disease has prevailed in recent years the relation of rats to its spread has been observed, and that since the discovery of the specific bacillus by Yersin and Kitasato, in 1894, bacteriological investigations have shown that there is no difference morphologically or culturally between the bacilli of human and rat plague. Moreover, the gross and microscopic lesions in the lymph nodes are practically the same, and the B. pestis recovered in both fulfills the postulates of Koch.

Nothing was definitely known, however, of the mode of transmission of the disease from rat to rat or from rat to man until the completion of the experimental work of the Indian Plague Commission. Simond, Ogata, Thompson, and Koch each expressed the belief that the infection was transferred by the rat-flea. Nuttall (1897) and Simond (1898) demonstrated the presence of the B. pestis in the bodies of bugs (Cimex) and fleas which had been taken from the plague-sick rats, and the latter observer, in the same year, succeeded in transmitting the disease from rat to rat without contact.

The work of the Indian Plague Commission was undertaken (1905) with a view to establishing the exact relationship between epizootics and epidemics and included both field and laboratory observations. The experiments of Gauthier and Raybaud (1903) and of Simond were repeated on a larger scale and greatly improved in that all rats and fleas used were first identified as to species. The findings of the Commission may be briefly summarized as follows: That fleas and bugs taken from plague-sick rats contain

B. pestis, and that some of them remain alive in the bodies of the insects from five to sixteen days; that plague is conveyed by the bites of fleas which have previously fed on the blood of animals suffering with the disease; that rat fleas bite man; that under experimental conditions the infection is not transferred from rat to rat in the absence of fleas.

A careful study of the findings of the workers in India justifies the assumption that plague is a disease of the rodent primarily, and accidentally and secondarily a disease of man. An analysis of the epidemiological facts collected in San Francisco leads to the same conclusion. As a result of our practice with regard to suppressive measures quarantine procedure has undergone a radical change in the last decade. If the infection is flea-borne from rat to man in the majority of cases, then the extermination of the rat should be the first principle upon which to base a campaign. In a former contribution on the subject (1907) I stated that, "If we destroy the host there is no longer danger of infecting the parasite." This basic principle has been recognized and successfully applied in two campaigns against plague in San Francisco: first, in the outbreak in Chinatown in 1903-04, and again in the larger epidemic of 1907.

The outbreak of 1907 began May 27th, a little over a year after the great fire and earthquake, but no cases were discovered between that time and mid-August when the disease began to appear in various parts of the City. The source of infection was, in all probability, a recrudescence from a focus which was not destroyed in the campaign of 1903-04. There occurred one hundred and sixty cases with seventy-seven deaths, the last one appearing January 30, 1908. The following table shows the incidence of human plague:

1907.	Cases.	Deaths.
May	1	1
August	13	6
September	56	25
October	34	25
November	41	12
December	13	7
1908.		
January	2	1
Total	160	77

Epidemiological Observations in San Francisco.

Abundant epidemiological data associating the rat* with the plague have been collected in San Francisco. For the purpose of illustration a detailed reference to a few cases will be made. Two small boys (October, 1907), while playing in an unused cellar found the body of a dead rat. The corpse was buried with unusual funeral honors. In forty-eight hours both were ill with bubonic plague. A laborer finding a sick rat on the wharf picked it up with the naked hand and threw it into the bay. He was seized three days later with plague. Doctor C. and family lived in a second-story flat over a grocery store in the residence section. Being annoyed for some days by a foul odor, the doctor caused the wainscotting around the plumbing to be removed. One or two rat cadavers were found in the hollow wall. In two or three days the two members of the family who used the room sickened, one dying on the fifth day of cervical bubonic plague. It is probable that infected rat-fleas were set free by the removal of the wainscotting.

Dead rats were frequently found in or near houses where

*M. norvegicus and M. rattus.

plague had occurred. Immediately upon the discovery of a case of plague trained men were sent into the neighborhood and a thorough search was made for rats. This work consisted in the removal of defective wooden floors and walls of insanitary buildings and other harboring places. Extensive rat catacombs were frequently found in these operations. In the yard of a house in which four cases had occurred twenty cadavers were found under the board covering. In the walls of a Chinese restaurant eighty-seven dead rats were uncovered.

Very little can be said of the relation of mice (M. musculus) to the epidemic. While many thousands were trapped, only a few hundreds were examined microscopically, and in those no infection was found. They are nonmigratory in habit and for this reason are not considered of much importance from an epizoological standpoint.

Transmission from man to man was observed in but a small percentage of cases; 3% to be exact. In these the probability of transference by fleas (P. irritans) or by bugs (Cimex) must be admitted. When more than one case occurred in a house a common source of infection was indicated, such cases occurring simultaneously or within from forty-eight to seventy-two hours after the first. Deratization was the measure mainly relied upon. After an infected house was rat-proofed, and the harboring places in the block destroyed, no further cases occurred.

The course of epizootic plague was not interrupted at any time by climatic conditions, there being as many cases in proportion to the rat population in the winter of 1908 as there were at the height of the epidemic. The last case of human plague occurred January 30, 1908, but the infection remained active among rats for eight months longer, or until October 31, 1908. (See following table.)

Month.	Number Examined.	Number Infected.	Per Cent.	Average Temperature.	Rainfall in Inches.	Character of Day.
1907.						Clear 13
Sept.	1,002	27	2.69	60.6° F.	.11	Part Cloudy ..15
						Cloudy 2
Oct.	2,679	23	.86	60.6° F.	1.36	Clear 10
						Part Cloudy ..10
						Cloudy 11
Nov.	3,954	36	.88	57.8° F.	.04	Clear 14
						Part Cloudy ..13
						Cloudy 3
Dec.	4,308	48	1.11	52.4° F.	3.66	Clear 6
						Part Cloudy ..11
						Cloudy 14
1908.						Clear 5
Jan.	6,622	70	1.05	50.8° F.	4.88	Part Cloudy ..11
						Cloudy 15
						Clear 11
Feb.	11,700	45	.38	51.0° F.	5.39	Part Cloudy ..12
						Cloudy 6
						Clear 20
Mar.	19,263	52	.26	54.8° F.	.90	Part Cloudy ..10
						Cloudy 1
						Clear 17
Apr.	15,524	34	.21	56.3° F.	.22	Part Cloudy ..10
						Cloudy 3
						Clear 17
May	11,311	20	.13	55.4° F.	.76	Part Cloudy ..12
						Cloudy 2
						Clear 16
June	13,624	4	.02	55.3° F.	.01	Part Cloudy .. 9
						Cloudy 5
						Clear 11
July	11,204	2	.017	57.4° F.	.02	Part Cloudy ..17
						Cloudy 3
						Clear 11
Aug.	10,988	0	0.	57.3° F.	.01	Part Cloudy ..10
						Cloudy 10
						Clear 16
Sept.	15,902	0	0.	59.3° F.	.29	Part Cloudy .. 9
						Cloudy 5
						Clear 16
Oct.	10,178	2	.019	58.8° F.	.061	Part Cloudy .. 7
						Cloudy 8

The rats examined for September, 1907, were very largely collected from the badly infected districts. The remaining months give a truer picture of the extent of the epizootic in the entire rat population.

Theories as to the Cause of Seasonal Prevalence.

The marked seasonal prevalence of plague in man in San Francisco may be given as additional proof of the association of the rat with its spread. In the cold, rainy season, from December to April, the epidemic ceases while the epizootic is apparently not influenced. The anomaly is accounted for when we remember that the rat and its parasites are very susceptible to cold and rain. It is then that the animal seeks a warm, comfortable place from which it does not venture until driven thence by dire necessity. In other words, the association of the rat with man is not so intimate in winter, while the reverse is true of the relation of rat with rat. The rains, while interrupting the overground migrations and domiciliary visits of rats, drive them to overcrowded burrows and harboring places. Another factor should be mentioned in this connection. Human fleas (P. irritans), probably rat fleas also, are markedly reduced in numbers at that season of the year. We must conclude, therefore, that the seasonal prevalence of plague in man is due to the effect of climatic conditions upon the habits of rats and life-history of the insect carriers of the bacilli.

An examination of the foregoing should convince everyone that all former theories as to the prolonged viability of the B. pestis in contaminated soil or in polluted streams, and of the periodical spread of the infection therefrom, are no longer tenable. It may also be stated that insanitary conditions, except in so far as they furnish food and shelter to rats and other vermin, play no important rôle in the continuance of plague. This general revision has also elimi-

nated overcrowding as an important factor. In the absence of pneumonic cases and of suctorial insects, this bête noire of the sanitarian may be disregarded.

The Occurrence of Plague in the Marmot of Asia and the Ground-Squirrel of California.

Rudenko (1900) first pointed out the possibility of contagion by the "Tarbagan," a species of the arctomyinæ found in Siberia. He observed a connection in 1894 between this rodent and an outbreak of plague in a Cossack family of Soktuewsk. According to Beliatsky and Zabolotny, each having been an observer in the same field, the natives of Siberia and Mongolia often acquire plague in this manner. Le Dantec and other writers have called attention to the probable susceptibility of the marmot (Arctomys bobac), a hibernating rodent of India and China. The marmot of Thibet, in the opinion of this writer, is the natural animal host and purveyor of the virus. The literature of the subject presents no bacteriological evidence, however, of such a relationship, and plague in the arctomyinæ of Asia is merely an hypothesis. There is positive evidence though of the susceptibility of the tree-squirrel (Sciurinæ) to plague infection. Dr. Alice Corthorn (1898) reported the finding of a plague-infected squirrel in one of the outbreaks in the Bombay Presidency.

Plague Infection in Ground-Squirrels.*

The demonstration of natural plague in the California ground-squirrel (Otospermophilus beecheyi) is perhaps the most important observation of the anti-plague work of the Service in 1908. The existence of a plague epizootic in Con-

* Genus citellus, Oken. Subgenus Otospermophilus. "California Mammals." Frank Stephens.

tra Costa County was suspected as early as the summer of 1903 and efforts were made at that time to collect sick and dead rodents for bacteriological examination. In August (1903) two fatal cases of human infection occurred in widely separated sections of the county. The investigation which followed failed to connect either with a previous case of human plague, but showed an association with ground-squirrels. These deaths occurred during a fatal epizootic among ground-squirrels and suggested a connection which unfortunately was not confirmed.

None of the circumstances were forgotten, however, and in the second campaign, begun in September, 1907, in San Francisco, inspectors were detailed to examine all persons dying in the area under suspicion. No plague was reported that autumn and winter. Fatal cases occurred and were reported by the inspectors in July, 1908, as follows: A boy (J. F.) died July 15th, near Concord, and a young woman (M. P.) died July 28th, on a ranch ten miles from Martinez. The two were not associated. An investigation was ordered at once and a force of trappers was hurried to the scene with instructions to collect squirrels from the ranches in the vicinity. The first plague-infected squirrel was found August 5th on the ranch where the boy had died July 15th. Of 425 squirrels collected from August 1st to October 12th, four showed the gross and microscopic lesions of natural plague. All the animals collected were forwarded in hermetically sealed tins to the United States Plague Laboratory, Oakland, California, it being the nearest laboratory to the focus of infection. P. A. Surgeon J. D. Long and A. A. Surgeon W. B. Wherry, Public Health and Marine Hospital Service, were on duty in the laboratory at the time, and the latter determined the nature of the infection. P. A. Surgeon G. W. McCoy, working in the San Francisco laboratory, also

confirmed the findings a day or two later from a piece of lung which had been sent to him.

A lad (F. M.) sickened August 5, 1908, in Los Angeles, California, after being bitten by a sick ground-squirrel. A polyadenitis, which afterwards proved to be plague, developed in a few days. A dead squirrel was found nearby and pathological specimens taken from it were sent to the United States Plague Laboratory in San Francisco. McCoy recovered the B. pestis from the tissue of the animal. This was the only case of plague reported in Los Angeles. In order to complete the list of those who contracted plague in the country two other cases should be mentioned. F. De S., a pregnant woman, died of bubo-septicæmic plague near Concord, California, February 29, 1904. The B. pestis was recovered in pure culture from the axillary glands. In April, 1906, a school boy of East Oakland developed a multiple plague adenitis. Investigation showed that he had shot and handled ground-squirrels in the country two or three days before his illness.

The Natural Habitat of Plague.

The location of the natural habitat of plague has concerned sanitarians for many years. Not a few have settled upon India as the endemic center, while others associate China with the epidemics which have devastated Europe from remote times. Le Dantec, a recent writer, suggests the "lofty mountains" between India, Thibet and China as the exact location, and selects the rodent (marmot) of that region as the natural epizootic host.

PLAGUE IN INDIA.

Sketch of Its Cause and Spread—Methods Adopted to Combat the Disease by Officers of the Indian Medical Service.

By MAJOR ARTHUR HENRY MOORHEAD,
Indian Medical Service.

Published in Vol. XXII, No. 3, of the Military Surgeon, March, 1908.

History.

The plague first appeared in Bombay in 1896 and was at first localized to that city. The infection was said to have been brought from China. When the disease was recognized as being Bubonic Plague, measures were taken; houses were evacuated; cases isolated in plague hospitals; segregation camps formed for contact cases, and houses disinfected.

Spread From Bombay City Throughout the Whole of India.

Unfortunately the disease spread outside the city and villages. Poona town was attacked. Calcutta became infected at quite a late period. During the last eleven years the disease has spread throughout the length and breadth of India. The spread has been slow but certain, and only large tracts of water have in any way delayed it. This is seen in the case of Burma, which for a considerable time remained free, and long after Calcutta had been attacked. The infection then reached it through its seaport town of Rangoon.

The large rivers of India, and especially the Indus have delayed its progress north. During this year, however, Peshawer and the frontier station of Dera Ismail Khan in which I am stationed, both north of the Indus, have been attacked for the first time. Practically speaking, at the present

time the whole of India is infected, though some places have not been attacked. Year by year the number of newly infected villages and towns increases, and they in turn become foci for its spread.

The number of cases of plague and mortality from the disease has practically, year by year, been on the increase since its first arrival in the country.

The annual mortality from plague in India since 1896 has been as follows:

1,704 (1896)	577,000 (1902)
56,000 (1897)	851,000 (1903)
118,000 (1898)	1,022,000 (1904)
135,000 (1899)	951,000 (1905)
93,000 (1900)	332,000 (1906)
274,000 (1901)	

During the first three months of this year the mortality has been no less than 495,000, by far the heaviest mortality yet recorded. (B. M. J.)

The total mortality since its first appearance has been as large as five and one-fourth million deaths.

The mortality for the week ending April 20, 1907, rose as high as 76,000 deaths, practically equal to the British army in India, wiped out in a week.

The total population of India is probably 300,000,000, but even so the mortality has been enormous.

Spread by Means of Rats and by Infected Cases Traveling in Railway Trains and by Road.

The spread of the disease is mainly through the medium of the rat. This fact is so well known in Indian villages that when dead rats appear in houses or sickly ones run out and die in open daylight (a common occurrence among Indian

plague affected rats) the inhabitants desert their houses, and usually fly to other villages. Experience has taught them to evacuate the infected houses which in early years they were bitterly opposed to when attempts were made to enforce evacuation.

The following is the sequence of events in a newly infected village:

FIRST: Dead rats are found in houses, or sickly rats appear in the daylight.

SECOND: Cases of plague appear and usually attack the inhabitants of houses in which the dead rats are found.

THIRD: There is a general exodus of the people, who travel by rail or road to their relatives in other villages and towns.

Many of these travellers are suffering from plague in its incubation stage, and a few from the active disease. These fugitive cases of themselves would not be dangerous to the new community they go to, but they carry on their body and in their clothes the rat flea. This rat flea finds its way to its natural host, the rat, and so a new colony of rats become infected and in turn give the disease to man.

At one period travellers by rail were medically examined and detained, but this has been given up since the disease became so general.

In a similar way examination of travellers at the river Indus ferry at Dara Ismail Khan proved effective for several years, but the disease has now infected the frontier provinces. The Hill stations by having strict medical examination and disinfection of clothes of native travellers have as yet suffered little from the epidemic.

Plague Primarily a Rat Disease and Secondarily a Disease in Man.

Plague is primarily a rat disease. Continuous observation has shown that rat plague always coincides in place with plague in man, and in time precedes it.

The rat family contains: Mus Decumanus (gray rat), Mus Rattus (black rat), Mus Musculus (gray mouse).

Plague is undoubtedly an epizootic disease in all of the rat family. It is not an infectious disease passed from rat to rat by contact but requires the flea to carry the infection.

This statement is very simple, but it has taken years of work to arrive at this conclusion.

The work of the Plague Commission in 1905, appointed by Government and the results of their experiments and conclusions drawn from them is the most important contribution to our knowledge of the disease, and specially establishes the importance that rat and flea bear to the disease.

Their first report appeared in the Journal of Hygiene, September, 1906, and their second report has only been completed in July this year.

The first report deals with a series of experiments carried out in Bombay, and the methods employed were very ingenious and well worth reading. The following are some of the most important conclusions come to:

(1). Healthy rats contracted plague in sequence to living in the neighborhood of a plague infected rat under conditions where contact was impossible, but where there was an abundant supply of fleas which could pass freely from rat to rat.

(2). Healthy rats living in flea proof cages have contracted plague in sequence to receiving fleas collected from rats dead or dying of septicemia plague in another cage.

The deduction from these two series of experiments is that the rat flea conveys plague from rat to rat.

(1). Similar experiments with guinea pigs showed that healthy guinea pigs only contracted plague when living in close proximity to plague infected guinea pigs when **fleas** were given free access from one to the other and not otherwise, though they were in contact with feces and urine of infected animals.

(2). Close contact of young even when suckled by plague infected mothers did not give the disease to the former.

(3). If fleas are present then the epizootic once started spreads from animal to animal, the **rate** of progress being in **direct proportion** to the **number** of fleas present.

(4). An epizootic may start without direct contact of healthy animal and infected animal. Thus in the case of one of the experiments the healthy guinea pigs were not put in until the last inoculated guinea pig had died and been removed.

(5). Infection can take place without any contact with contaminated soil. Thus several guinea pigs and a monkey placed in wire cages two inches above the ground developed plague. Aerial infection is excluded. Thus guinea pigs suspended in a cage two feet above the ground which is beyond a flea's jump did not contract the disease, while in the same room those animals allowed to run about and placed two inches above the floor became infected.

Plague can be transmitted by the rat flea not only from guinea pig to rat, but from rat to guinea pig. Further, it can be transmitted from guinea pig to monkey.

The unfortunate guinea pig was found to be a certain bait for rat fleas and use of this was made.

One of the guinea pigs was allowed to run loose in the laboratory and the rat fleas which escaped invariably preferred it to man, and in this way proved a guardian angel to him.

This reminds me of a story of the early days of plague research; a young officer of the I. M. S. was working privately in his own bungalow (house) with fleas which he collected from plague infected rats. He had invented a method for keeping the jumping flea in control; namely, by having each one glued to a hog's bristle by means of secotine. One day some of these escaped into his bedroom and could not be found, so he was forced to sleep on the roof of his house for several nights. Now if he had known what we now know, a guinea pig placed in his room would have collected them all for him.

Another use was made of guinea pigs, namely, to decide whether houses in which plague cases had occurred and which had been carefully disinfected were still dangerous to live in.

They were placed in these houses and ran about loose and they invariably collected fleas in large numbers, and a considerable number of guinea pigs died of plague. These houses were disinfected by washing the walls and floors with acid solution of perchloride of mercury, strength 1 in 750, which kills Bacillus Pestis in organic mixtures.

The fleas by such disinfection are not reached as they find shelter under sand and in cracks and holes.

Infection of Man Through the Flea.

The next point to consider is how man is infected with plague by the flea and what species of flea carries the Bacillus Pestis. The second report of the Bombay Plague Commission printed in July of this year in the Journal of Hygiene deals fully with this question.

I can only give you a few of the results of their experiments. The fleas experimented with were the Pulex Irritans (the **human flea**), Pulex Cheopis (rat flea) and Pulex Felis (cat flea), Pulex Ceratophyllus Fasciatus (the common rat flea of North Europe).

The results of the experiments were:

(1). The rat flea conveys plague from animal to animal.

(2). Of thirty-eight experiments with human flea three were successful.

(3). Of twenty-seven experiments with cat flea none were successful.

(4). In two experiments with Pulex Ceratophyllus Fasciatus both were successful.

The medical student of the future will have to study the anatomy of fleas as well as that of man. I will not describe the difference in them, but full details are given in the reports quoted. It may be news to some of you that a flea has a gizzard!

A most important point is the nasty habit it has of squirting blood from the intestines at the same time that it is sucking in blood and curiously this is the most probable way it gives infection to its host, because the bite of the flea is irritating and is usually scratched and thus the discharged contents of the flea's intestine, now proved to contain abundant Bacillus Pestis is rubbed into the punctured wound caused by the flea in the act of biting. Plague bacilli have been found in stomachs of rat and human fleas.

Multiplication of the bacilli takes place in the stomach of fleas. Bacilli are present in the rectum and feces of fleas taken from plague rats, and such feces are infective to guinea pigs both by cutaneous and subcutaneous injection.

On rare occasions they have been found in the esophagus, but nowhere else as in body cavity or salivary glands. Both male and female rat fleas transmit the disease.

A single rat flea can transmit the disease. The experiment showed that the human flea can convey the infection, but the main factor is no doubt the Pulex Cheopis or rat flea.

Does the rat flea attack man?

That has also been proved, and in laboratory experiments it will readily bite man. When very numerous it will bite man even in the presence of its natural host. It has also been kept alive for more than three weeks by feeding it on man. Rat fleas were found on legs of men sent into rooms infected with them, and also when sent into houses in which plague had occurred.

I expect every person here has at some time had a personal encounter with a flea.

I will tell you mine.

I went to stay a week with a friend at Chohderea fort beyond the frontier. I was given the only spare room, which had been kept shut for some time before my arrival. The first night I was badly bitten by fleas. My friend in the next room had none. The reason was that the officer formerly in my room kept dogs and had departed some time before and the fleas left behind were soon starving and made a good meal off me.

This is exactly what happens to the rat flea in India.

Its natural host, the rat, gets plague and dies. As soon as the rat dies the fleas desert the body at once and for a short time remain in the holes of the houses and floors. As soon as they are starving they seek a new host, which may be man or animal, bite him, or it, and convey the disease plague to their new host.

I have seen a whole village in India deserted of inhabitants and all the huts apparently empty, but really they are full of hungry, starving fleas, as their natural hosts, the rats, have all died of the disease. Woe betide the man that enters those huts and sleeps in them!

The common position of the bubo in man is the groin, and this bears out the fact that fleas reach him first through the lower extremities.

Seasonal Prevalence and Its Explanation.

One of the most striking characteristics of plague once it has become endemic is its seasonal prevalence. At or about the same time it yearly reappears, rises, declines and disappears.

In India the disease lies dormant during the winter months, but as spring comes on the disease appears and increases and is at its height during the months of March and April. In May the hot weather arrives and the decline is then rapid and in most places the disease disappears till the next spring. This is the history in the Punjab in North India, in which province I have served all my service. What is the explanation of it?

It is no doubt caused by the disease remaining latent in rats, which are now proved to suffer from chronic plague during the non-epidemic season.

This chronic plague has only lately been made out, and the lesions in the chronic disease are always in circumscribed abscesses and the animals are not emaciated or sickly.

Post mortem examination revealed abdominal abscesses and cultures taken from these abscesses were inoculated and proved generally fatal to the animals inoculated.

The rats that suffer from chronic plague were very few in Bombay, but numerous in the villages of the Punjab, and the position of their abscesses in the abdomen leads one to infer that they are infected through the intestine.

The very extraordinary rise of the disease is explained by the fact that in spring the fleas breed and are most numerous, and convey the disease to man. The proportion of fleas which contain Plague Bacilli in their stomachs is six times greater in the epidemic season. The hot weather causes the disease to decline no doubt, mainly because the virulence of disease among rats diminishes, and because the fleas die off and the

population live more in the open and sleep outside their houses.

Some years ago we explained the decline by saying the high temperature was inimical to the growth of the bacillus in the earth. This leads me to consider the question of the growth of Bacillus Pestis outside the body.

For long in India it was believed that plague lived and thrived in the floors of native huts, which are commonly compressed earth covered with a mud plaster containing cow dung.

The Plague Commission has also settled this point, and their conclusion is that plague bacilli in cow dung floors of native huts and in the lime plaster of better houses not only do not multiply but soon die out altogether. I will not give you the details of the experiments, but it would appear that animals can walk about and sleep on floors grossly contaminated with virulent cultures of Bacillus Pestis without contracting plague if only an interval of twenty-four hours is left between the contamination and the placing of the animals on the floors.

Plague Bacilli Unable to Live a Saprophytic Existence.

Plague Bacilli are therefore unable to live a saprophytic existence and it is necessary for their propagation to live in the living tissues and blood of the rat.

The nature of the disease bears this out: Plague is an acute septicemia. At first it generally enters by the lymphatic system, and nature's attempt to arrest it in the lymph glands is the cause of the bubo.

In the later stage and in all fatal cases it becomes a general infection and the bacillus is found in the blood and internal organs.

The bacilli of plague may number as many as one hundred million per c. c. in the blood of the rat, and a flea's stomach may easily contain 5,000 of them.

The plague bacillus was found not to lose its virulence by a series of inoculations and subcutaneous injections into rats.

Effect on the People of India and on the Indian Army.

The people of India have endured the disease in the same Oriental way as they endure famine. It is fate! or Kismet, or the will of God! they exclaim, and they are content to make the best of it once it has arrived. It is, however, very hard and almost impossible to get them to take precautionary and sanitary measures prior to its arrival. The people of India are ignorant, suspicious and distrustful and any measure taken which will change their ordinary routine of life is sure to fail.

It is impossible from home to indicate the lines of action, and only the authorities in India know what measures will be carried out in a country so diverse in races and religion. The prevalence of the disease in the spring is most disastrous as it is the time the crops are cut. In the Punjab yearly many thousands of acres of crops remain uncut as no labor is obtainable. The villages become infected the mortality is enormous and the people fly to towns or other localities.

The mortality among women is greater than among the men because they are very often kept perdu and shut up in their houses, which are infested with fleas. Fewer women mean dearer marriages, and many natives already ruin themselves to marry off their children. The village farmers and their elder sons are in possession of the land, but when killed off by the plague the younger sons, often in the army, have to resign to take over the property. It is also harder to get recruits for the native army.

Each year a large number of men of the Indian army die of plague when on leave in their village. They are practically safe in cantonments, where if the disease does appear it is soon checked and many men defer taking leave till the season when the disease lies dormant.

On my way to England I traveled in the train with a native officer of my regiment. During the conversation I inquired after his brother, upon whom I had performed the operation for cataract. He replied, "He died of the plague and all my family with him. I have no home or wife or relation to go to so I will take no leave this year."

Future Outlook.

The future outlook and likelihood of the spread of the disease to Europe is a very serious problem.

The disease in eleven years has spread through the whole of India and I have no doubt will next infest Afghanistan and Persia. These countries lie in the northwest frontier and are adjacent to Russia in Europe, and they are not likely to adopt more vigorous measures than have been done in India.

Wherever the plague carrying rat and its flea, the Pulex Cheopis, can travel and live, the disease is sure to spread to, and I believe it will reach Europe overland.

Rat Flea or Pulex Cheopis.

The rat flea, Pulex Cheopis, has been found and is common in warm climates, but is rare in north Europe. The flea described in Sydney and Brisbane, Australia, is similar to Pulex Cheopis. The same or similar flea is found in seaports of Italy and Marseilles.

It is very common in South America, and has been found in Egypt and South Africa.

I regret to say that the disease has attacked the United States, and San Francisco is now fighting to get rid of the disease, and I have no doubt that the Pulex Cheopis has been found on the rats of that city.

The condition of affairs in the seaport of San Francisco must be similar to that existing in Sydney, which has suffered several infections by plague.

The experience gained in Australia in conducting a campaign against rats would prove useful to the sanitary authorities of San Francisco. Dr. Asburton Thompson of Sydney has written a most instructive article in the Journal of Hygiene, October number, 1906, on this subject.

Preventive Measures. Early Methods Adopted to Check the Disease, Later Methods and Reason for Change.

The preventive measures used in India to fight the disease and stop its spread have changed with the better knowledge gained of the disease.

Early Methods: Evacuation from infected houses was insisted upon from the first but was most unpopular. It was not enforced after some riots had occurred. Separation and treatment of sick in hospital and segregation of contacts were also unpopular and resulted in concealment of cases.

Disinfection of Infected Houses: The prevailing idea was that the germ was in the soil; the floors of houses were even dug out and removed. More commonly disinfection with an acid solution of perchloride of mercury was carried out.

Dry heat, namely, dessication by open stoves in the rooms of houses was popular for a time, especially as it saved the native the trouble of moving out his household goods. Removal of roofs of houses allowed in the sun and light, the two things shunned by the flea.

Disinfection of clothing of plague cases and burning of bedding material and of wooden beds was also done.

Passengers by rail were medically examined at stations.

Later Methods: The methods employed at present and recommended as efficacious are:

Evacuation.

Inoculation.

Rat destruction.

The value of the last, viz., rat destruction is doubtful. Reports from the Punjab are greatly in its favor, and it is being carried out vigorously. However, it was found in Tokyo in Japan that the result after destroying four million rats was that the breeding rate increased as the struggle for existence amongst rats was relieved. A new suggestion, I believe of the Salvation Army, is to import a ship load of cats to India to kill rats.

Inoculation.

Inoculation shows excellent results as a preventive and as decreasing the severity of the attack of plague. It, however, has had a very unfortunate history in India.

Some four or five years ago the Punjab Government attempted to inoculate and so preserve the fighting races of north India, and the attempt met with a large amount of success.

A most unfortunate occurrence happened and fourteen people in a village inoculated with plague serum died of tetanus. It was a severe blow to inoculation. Confidence in it is slowly returning and I hear that fifty per cent of the men of my regiment were inoculated this year when the disease broke out at Dara Ismail Khan.

The disadvantage of inoculation is that it only confers immunity for one season. People who object to be vaccinated

twice in a lifetime would be seriously upset with the prospect of an annual inoculation against plague.

Methods Employed at Present by the Officers of the Indian Medical Service.

The officers of my service are employed in India on plague duty. They are nearly all young officers taken from military employment and in many cases they pass on to civil employment after it. There are large Civil districts in India, each one with its Civil Surgeon who at first was burdened with plague duty, but since the disease has become so general a plague medical officer is appointed to do plague duty only.

When I did plague work in 1903 I used to visit infected houses and implore the people to evacuate them or live in the sun on the roofs of the houses. The sanitation around the house was improved as far as possible. The rooms of the house were disinfected with mercury by a gang of men with mops, squirts, etc., or by dry heat stoves.

Carbolic acid mixture was prescribed for the patient. If the patient died, his clothes and bedding were burnt or dipped into strong mercurial lotion and the body was buried deep in the ground, wrapped up in a sheet dipped in mercury solution. The contact cases as far as possible also had their clothes disinfected. I recommended a town of 10,000 inhabitants to destroy their rats and pay a small reward for each rat brought in. The Hindus, however, objected to taking the life of an animal and there was no money to pay the reward.

In a country where I have seen pious Hindus doling out sugar on any heaps to feed them, a rat campaign is very difficult. Plague duty in India at the present time is directed to destroying rats, killing fleas, preaching evacuation and endeavoring to restore the popularity of inoculation.

What is required, no doubt, is to draw the whole of the efforts and sympathy of the population to help the plague medical officer. Every minor government official should also be made to assist in this work and to awake the native races from their apathy.

Still more is required, namely, to teach the native to construct and live in rat-proof houses and to protect his grain stores from rats. At present the vast majority live in huts with mud walls and roofs into which rats burrow freely and live and also have no difficulty in reaching their grain depots, which are constructed also of mud.

Description of an Epidemic in a Native Regiment.

I will now give you a short description of an epidemic in my own regiment, the 16th Native Cavalry. It occurred when we were in Jhelum several years before the importance of the rat and flea was discovered.

Jhelum Cantonment, where the troops reside, is situated close to Jhelum town on the banks of River Jhelum in the Punjab.

The town of Jhelum was suffering from plague and the native Sepoys were forbidden to enter it.

On the opposite side to the city and only 600 yards from our lines was a very dirty village also suffering from plague.

The first case occurred in my colonel's compound, which curiously was the closest house to the village. One of his grooms was attacked with plague and the history was that dead rats had been noticed previously in his servants' houses.

The man with his wife and child were removed to Plague Camp Hospital, and later both of these developed the disease.

The next case was another servant in the same block of huts.

Then the disease appeared among the mess servants and our cook's two sons were attacked and died. I had myself seen rats in a sickly condition in the daylight in his hut and told him to evacuate it, but he disobeyed the order whilst the other servants who lived in the tents provided, all escaped. One of the fighting men of the regiment then developed pneumonic plague and died, so I ordered the whole regiment to evacuate the lines and live in camp. A recruit was attacked on the day of the move, but after this not a single case occurred.

Unfortunately, the followers of the regiment, namely, grooms, water carriers, sweepers, cooks, could not be provided with tents and remained in their huts and several of them were subsequently attacked. Eventually they moved out into camp and the disease at once stopped.

The following were the measures adopted by me:

(1). All plague cases were removed to plague hospital on the boundary of cantonment. This hospital consisted of several grass built huts with open doors and very free ventilation.

The sick attendants, hospital assistants and staff of servants lived in tents close by and were never changed. A guard over this hospital prevented all communication and permitted only the medical officer to enter it.

(2). All contact cases were isolated in a camp for ten days and daily inspected and their clothing disinfected in perchloride of mercury lotion and placed in the sun for four hours.

(3). A medical inspection of the whole regiment and followers was made daily.

(4). An airing of all kit, clothing and bedding in the sun for four hours daily.

(5). All the barracks occupied by the men and followers'

huts were disinfected by swabbing floors and walls with strong perchloride of mercury or carbolic, and later were all lime washed.

All huts in which cases of plague had occurred had the roofs removed and remained in this state for a couple of months.

(6). All dead rats found were burnt with kerosene oil and special disinfection of places in which they occurred.

(7). Inoculation was not carried out.

(8). Rat destruction was not employed, as the importance of the flea was not then known.

The treatment of the plague cases was as follows:

Buboes which mostly were in the groin were opened and dressed antiseptically. The present treatment is to open and drain these at a very early date and prevent the poison entering the system. The strength of the patient was kept up by suitable diet and stimulants very freely given.

I also tried internally large doses of carbolic acid freely diluted. Doses as large as eight grains twice or thrice daily were given, as this method was favorably reported upon in an article in the British Medical Journal when used in the Hong Kong epidemic.

The rest of the treatment was symptomatic. For the very high fever, ice to head, cold packings and iced water enemata were employed, and stimulants freely given in the event of cardiac failure.

The result of this treatment was, my mortality was sixty-five per cent, which was very satisfactory. I cannot say if this was due to the carbolic treatment or to the very careful nursing and treatment of Lieutenant Rutherford of the I. M. S., who was in charge of the plague hospital.

A curious after result in many cases that recover from plague is an affection of the speech and difficulty in articulating words.

The sputum in the Pneumonic form is characteristic, being liquid blood in large quantity, like an hemoptysis.

The white races have escaped it to a rather large extent. The natives have said the white men introduced it and it does not attack the white man. Unfortunately, white men do occasionally get it. Major Moore died of it in Bombay. An R. A. M. C. died of it. The white men live in pukka houses, composed of brick and cement floors and rat proof and we are more cleanly. We live under better surroundings and conditions and have better hygiene. It is hard to get the natives to carry out rat destruction. The officers on plague duty are instructed to carry out rat destruction as far as they are able, but you cannot compel natives to do it. You have to interest them and ask them to do it of their own free will. They are given opportunities to carry out rat extermination by giving them poison.

I do not believe that patients are rendered immune, and have heard of cases being attacked twice.

I hope these few words on Plague in India will help you to understand the difficulties of treating and checking such a disease in a country like India, and I shall be more than content if I have enlisted your sympathies with the people of India in their calamity and interested you in the work of the I. M. S. in India.

THE CAMPAIGN AGAINST PLAGUE IN SAN FRANCISCO, CALIFORNIA.*

By RUPERT BLUE, M. D.,

Passed Assistant Surgeon U. S. Public Health and Marine Hospital Service, Commanding Anti-Plague Operations in San Francisco, California.

Aside from the benefits accruing to the infected locality, anti-plague operations are valueless to the scientific world unless accurate observations are made and principles deduced therefrom and published for the benefit of those who may be called upon at some future date to cope with a similar situation. It is hoped that a recital of the measures which seem to have proven of greatest value in San Francisco may in this way be worthy of the attention of the PAN-AMERICAN MEDICAL CONGRESS.

History: Plague made its first appearance in San Francisco in March, 1900, and was confined to that portion of the city known as Chinatown until February, 1904, when it was completely eradicated after a relentless campaign of eighteen months' duration. One hundred and twenty-one cases occurred, only eight of which recovered.

The measures which proved of value in eradicating the disease in that outbreak were: The destruction of all rat-harboring places such as defective basements and improperly constructed side-walls; careful search for rat-cadavers and the complete rat-proofing of buildings with concrete. A vigorous campaign of rat trapping and poisoning was prosecuted in the infected district and the rodent population therein further diminished by the removal of their food supply.

* Read before the Pan-American Medical Congress at Guatemala.

In April, 1906, a large portion of the city was devastated by fire and earthquake. Thousands were rendered homeless and obliged to live under most insanitary conditions for a time. During the period of reconstruction which followed, the necessity for civic cleanliness was temporarily forgotten and it is not surprising that a case of plague occurred May 27, 1907. No more cases were reported until August 12th, although it is not improbable that cases occurred during this interval. From this date on, cases appeared in rapid succession, the epidemic reaching its height in September, 1907, and gradually decreasing until January 30th, 1908, when the last case, up to the present writing, occurred. Thus far 159 cases have been discovered; of these 121 were bacteriologically proven plague, and 39 were diagnosed clinically. Seventy-seven of the cases died.

NOTE.—During the period from January 30th to date (July 23) no case of human plague has occurred in the city of San Francisco, Cal. The work, however, will be continued for twelve months after the last case.

At the request of the municipality of San Francisco the Federal Government took charge of the situation in mid-September. At this time there were in the city thousands of most insanitary dwellings, restaurants, stables and other buildings, the scavenger service was defective in the extreme and rat-food was scattered every where. Rats existed by the thousands and fleas were unusually numerous. There was no proper plague hospital, and while the San Francisco Board of Health was doing all in its power to stem the tide of infection it was greatly hampered by lack of funds on account of the depleted condition of the City Treasury.

Care of Human Cases.—At the cost of $15,000.00 a rat-proof compound was constructed, surrounded by a galvanized iron fence, seven feet high, resting on a concrete base sunk

two feet in the ground. On the top of the fence was an inverted metal trough looking inward, so that if a rat should by any chance enter the enclosure, his escape would be rendered impossible. The patients were treated in simple cottages, and trained nurses and skilled physicians were employed to care for them. It was recognized that uncomplicated bubonic cases were not contagious and when they could be kept in good surroundings under proper surveillance, they were allowed to remain in their homes. This privilege was seldom granted, however, on account of the liability of these cases becoming secondarily pneumonic or septicæmic and therefore dangerous to their environment. Contacts to human cases were kept under observation for the full period of incubation and were given immunizing doses of Yersin serum as prepared by the Pasteur Institute of Paris. Contacts to rodent cases, i. e., persons living in premises from which rats infected with plague had been taken, were treated exactly as those exposed to infected human beings. Their names were taken and they were visited each day for eight days.

Measures Contemplating the Destruction of Infecting Agents.

Buildings from which human or rodent cases of plague were taken were treated in exactly the same manner. They were fumigated thoroughly by means of sulphur dioxide gas, the carpets were removed and thoroughly beaten and the floors washed down with a bichloride of mercury solution (1-500). The surrounding buildings were treated in much the same manner and especial care was taken to destroy the rendezvous of the rats and breeding places of rat-fleas. The entire neighborhood was searched for rat-harboring places, and back yards, defective board-walks and imperfect flooring, beneath which rats could find shelter, were

torn out, and, if possible, were replaced with concrete. The treatment of the infected house and its contents included the burning of the bedding which was soiled by the dejections of the patient, the destruction of such clothing as may have been contaminated by his discharges, the sweeping of trash and burning it, and, as has already been stated, washing down with a strong antiseptic solution. In addition, careful search was made for rat-runs and rat-holes, and if practicable, the house was rendered permanently rat-proof.

In order to accomplish these results with the greatest accuracy and smallest expenditure of energy, the city was divided into thirteen districts, each of which was placed in charge of a Medical Officer of the United States Public Health and Marine Hospital Service. He established headquarters in a central location in his district, secured telephonic connections and began the active prosecution of the campaign in his particular portion of the city. His force consisted of Inspectors, Assistant Inspectors, Foremen and Laborers. He was given proper transportation and a wagon for the carrying of supplies and disinfectants about the district. Stores were issued to him, consisting of rat traps, rat bait, such as cheese, bacon, etc., rat poison, such as arsenic or phosphorus paste, for example, Stearns' Electric Paste, disinfecting agents such as sulphur, creofect, bichloride of mercury, etc., and such miscellaneous supplies as stationery. Proper blanks were furnished his headquarters and he was given cards for recording the results of the sanitary survey. All of these districts were controlled from the general headquarters where the Commanding Officer and his staff were located. Here was the Division of Personnel and Accounts, and Statistics, and here all orders were prepared and issued to the Medical Officers in charge of districts. The entire headquarters was under the direction of

the Executive Officer who was responsible for the proper discipline of the force and the details of the work. At the headquarters was also located a Bacteriological Laboratory, and it was here that material obtained from human necropsies was examined and the rats inspected for bubonic plague. It was recognized from the beginning that in order to discover all cases of human plague it was necessary to inspect all dead bodies in the city, prior to their removal by the undertaker. For this purpose three special Inspectors of the Dead were employed and no corpse allowed to be moved until it had been viewed by the Inspector and a permit issued by him. In all cases where doubt existed as to the cause of death, a necropsy was ordered and a bacteriological examination of the tissues made.

The work in the districts consisted of inspection, disinfection, wrecking, rat trapping and rat poisoning. Each inspector was given a portion of the district and was required to visit every building therein and determine its location, use, the number of persons living or working therein, the prevalence of rats and rat-holes, the number of sick, if any, during the past six weeks, the occurrence of human or rat-plague since June 1, 1907, nuisances on premises, means of garbage collection and disposal, manner of sewage disposal, and nature of the ground floor. All of this information was reported on a proper card and the card indexed. Persons found guilty of infractions of the sanitary laws were served with a notice that they must abate the same. This notice gave in detail the work to be done by the householder and he was given a reasonable length of time in which to comply. Three notices were usually served before the person was arrested for non-compliance and brought before the Police Judge who, as a rule, fined him.

The Supervisors passed suitable ordinances requiring the use of garbage cans and the employment of scavengers, the rat-proofing of houses, stables, warehouses and chicken yards, and it was the duty of the Inspector to see that these laws were obeyed. It is remarkable what results were obtained in this direction. Thousands of garbage cans were installed and hundreds of buildings rendered permanently impervious to rats.

The rat being the factor most concerned in the dissemination of the disease, the campaign was directed against him with great assiduity. The experience of other observers has shown the fallacy of attempting to exterminate rats by means of trapping and poisoning alone, and while these measures were extensively employed, they included only a small portion of the work done. An endeavor was made to render the rat absolutely homeless, and as has already been shown, his habitations were destroyed wherever found.

The rat crusade was indispensable for two reasons: In the first place, it diminished the number of rats very greatly. In the second place, it procured for bacteriological examination the cadavers of rats, and in this way the location of infection was revealed and the knowledge thus gained directed the application of anti-plague measures. It is important to know the percentage and location of the infection, and it has been found that districts which at one time were badly infected became free from rat-plague infection for considerable periods of time after the rigid application of anti-plague measures.

Measures Contemplating Permanent Civic Immunity.

Rat-proofing is useful as a prophylactic measure, not only for the purpose of eradicating the present epidemic, but also for the elimination of bubonic plague permanently from the

city. This may be accomplished in two ways. First, by the use of impervious material such as concrete, brick or stone on ground areas and the careful screening of all openings near the soil-level. One of the most important principles which this campaign has brought out is the second method of rat-proofing, that is, rat-proofing by elevation. This means allowing free access to the natural enemies of the rat by raising the floors of houses at least eighteen inches above soil-level and leaving the underpinning exposed so that dogs and cats may easily get beneath the building. This not only applies to buildings, but also to such material as grain in bags, lumber and other commodities which might afford protection to the rat.

The results attained in Lobos Square Camp may be cited as an illustration of the value of this measure. A camp of 750 wooden cottages had been constructed by the Red Cross Society in one of the city parks for the housing of 2,000 homeless people. Although due care had been taken to maintain good sanitary conditions, plague made its appearance among these people in September. Eighteen cases occurred in all. Fumigation and disinfection of the houses of the patients failed to check the progress of the infection. Finally, as a last resort, the cottages of the entire camp were elevated eighteen inches from the ground, left free on the sides, and no further cases occurred. From the number of rat cadavers found beneath the cottages, and the absence of nests or permanent abodes therein, it is believed that infection gained access to the camp through the migration of plague-sick rats from the outside. Elevation, then, removed the temporary shelter and freed the camp from further infection.

It should be mentioned in this connection that prior to the catastrophe of 1906, San Francisco was almost entirely

a city of wooden buildings. Since the great fire most of the permanent structures which have been erected have been of rat-proof construction. The great proportion of buildings at present standing, however, are of wood with hollow walls and erected on sandy soil, making these buildings ideal rat-harboring places. This played a very great rôle in the propagation of bubonic plague in San Francisco and is a factor which must always be taken into account in any plague campaign.

The sewers of San Francisco were in a poor condition on account of the damage they had sustained during the recent earthquake. The use of traps in sewers demonstrated the presence of large numbers of rats therein, in fact, they seemed to be the great rodent highway. The breaks in their sides afforded easy ingress and egress for the rat. It was therefore apparent that in this way the rat could travel from one part of the city to another and often find easy entrance into the houses of man. Gangs of men were therefore placed in the sewers with instructions to repair these breaks, as far as possible, with brick, mortar and cement. This work has been going on for some time and it is believed it will yield good results, but sufficient time has not yet elapsed to thoroughly prove this.

In order that the disease might not spread to other cities, the collection, sterilization and distribution of rags was carefully supervised. For fear that the carcasses of plague-infected rats might be removed from the city in stable manure, the State Board of Health passed a ruling forbidding such shipment unless accompanied by a certificate from the Chief Sanitary Officer to the effect that the manure was removed from a rat-proof stable. This had the desired effect of preventing the exportation of plague-infected rats and also of causing the stable owners to place their premises in a sani-

tary condition in order that they might secure a permit. All freight leaving San Francisco by water was inspected prior to embarkation, and such products as grain, dried fruit, flour, hides, etc., were not allowed to be shipped unless they had been stored in a rat-proof warehouse and on examination found to be free from rat-infestation. It was suggested to the shippers that the construction of a rat-proof compound on the wharves for the temporary storage of these commodities would obviate a great deal of trouble. It is believed, however, that the chance of the spread of plague by contaminated freight is relatively small. Human agencies in the spread of the contagion do not seem to play any great rôle.

Numerous experiments were made with various rat-guards on ships and it was very clearly shown that the one at present in use is entirely inadequate. A very ingenious contrivance consisting of two metal cones placed base to base in whose interior was placed a trap for the catching of the rat, seemed to give the best success.

Contributory Causes of the Spread of Infection.

One of the great factors in the spread of plague infection is the faulty construction of the habitations of man. During the present epidemic almost none of the cases occurred in Chinatown, which was thoroughly rat-proofed during the previous epidemic and no human cases were found in that portion of the city where all of the buildings were provided with concrete basements. This may explain the apparent immunity of the white race to the disease in tropical countries, for there, they are usually the ruling class and live, for the most part, in sanitary buildings. This also explains, in all probability, the disappearance of plague from Europe. At the time when plague ravaged that continent, wood was

comparatively cheap and was very largely used in the construction of buildings, but as wood became scarcer, and therefore higher in price, stone was substituted, and to-day practically all of its large cities are of rat-proof construction. In many of the buildings from which human cases were taken in both epidemics, the cadavers of rats dead of plague were found, sometimes beneath the floors and at other times in the hollow walls or ceilings. In several instances they were in such locations that it was very easy to see how the infected fleas had left the cold body of the rat, on its death, and found easy access to the human being who was subsequently stricken with the disease.

On account of the low viability of the bacillus pestis in feces and urine it is entirely probable that insanitary conditions such as pollution of the soil with excrement plays a very small rôle in the spread of the disease. My experience has lead me to conclude that insanitary conditions contribute to the spread of plague only in so far as such conditions afford food and protection to rats and breeding places for suctorial insects. The proper disposal of garbage and the destruction of the rat and his harboring places are, therefore, the great factors in the elimination of plague.

Among the lessons which may be drawn from the foregoing we may note:

First: The fundamental principle of plague eradication is rat eradication.

Second: This can only be accomplished by a simultaneous attack upon the rat, his food supply and his habitation.

Third: The permanent eradication of plague is directly dependent upon the amount and permanence of the rat-proofing done.

Fourth: Hereafter quarantine against plague should be directed against rats rather than against persons and freights.

Fifth: Plague may, and often does, exist in the rat population of a city for several years before it is discovered among human beings. It is therefore advisable for maritime cities to systematically trap and examine rats to determine the existence of infection among them. The recent advance of the disease northward from the continent of South America to the Islands of the Spanish Main indicates the great necessity for the adoption of this measure.

SUBSCRIBERS TO THE CITIZENS' HEALTH COMMITTEE FUND.

NAME	SUBSCRIPTION
Alaska Packers' Association	$ 100.00
Armsby Co., J. K.	110.00
Associated Oil Co.	100.00
Arrigoni, Hugo	2.00
Adams, W. J.	30.00
Alexander & Baldwin	125.00
Allen, Henry F.	100.00
Abrams, N.	10.00
Ames, Harris & Neville Co.	150.00
Abrahams, Max	20.00
Anderson & Lewis	20.00
Abrams, Henry M.	25.00
Alexandra, The	25.00
Ahlbach & Mayer	25.00
Adams, Chas.	10.00
Anspacher Bros.	100.00
Allee, J.	20.00
Ayers Drug Co.	10.00
Atchison, Topeka & Santa Fe	15,000.00
Albers Bros. Milling Co.	25.00
Allen Co., The Wiley B.	50.00
Andrews, Chas. H.	10.00
American Steel & Wire Co.	1,000.00
American Type Founders Co.	250.00
American Real Estate Co.	100.00
Aronson, A.	25.00
Anglo-American Crockery & Gl. Co.	100.00
American Import Co.	50.00
American Milling Co.	25.00
Alonzo & Co., H. S.	3.00
Arnhold & Co., B.	25.00
American Tool Works	10.00
Altmans, Inc.	50.00
Assessor's Office (Employees)	50.50
Anglo-Californian Bank, Ltd.	1,000.00
American National Bank	500.00
American Laundry Co.	25.00
Atkins, Robert S.	25.00
America, Hotel	25.00
American-Hawaiian S. S. Co.	1,000.00
Board of Fire Underwriters of Pacific	10,000.00
Blake, Moffitt & Towne.	150.00
Belli Bros.	5.00
Biscotto & Co., G.	3.00
Baldacci, N.	5.00
Baldocchi, F.	6.00
Berg, W.	50.00
Barnard & Bunker	25.00
Bowring & Co.	50.00
Bissinger & Co.	225.00
Butler, Geo. E.	25.00
Bernstein, H.	5.00
Beerman & Co., A.	10.00
Banner, M. G.	10.00
Butler, Schultze & Co.	100.00
Bauer Bros. & Co.	250.00
Bullock & Jones Co.	50.00

NAME	SUBSCRIPTION
Balfour, Guthrie & Co...	200.00
Big Bend Milling Co., The	20.00
Berteling Optical Co....	10.00
Baldwiu Jewelry Co.....	25.00
Bullion, A. H.....	10.00
Brunn, H.	10.00
Bekins Van & Storage Co.	100.00
Britt, James E.....	25.00
Buick, Wm.	10.00
Bernard, George	25.00
Brandenstein & Co., M. J.	500.00
Bowers & Son, J. T.....	10.00
Biggs Co., Don.....	50.00
Bacigalupi & Co., Peter.	10.00
Bayle, Lacoste & Co.....	150.00
Brewers' Protective Assn.	10,000.00
Baker, Sylvester A.....	5.00
Boardman Co., W. F....	20.00
Bauman Printing Co....	10.00
Bickford, C. E.....	20.00
Baruch & Co.....	75.00
Bemis Bros. Bag Co....	50.00
Barneson, Hibberd Co..	50.00
Bouquet Cohn Cigar Co.	25.00
Bernhard, P. D.....	5.50
Barker Mfg. Co., Jas. (Barber)	10.00
Bauer Mfg. Co.....	2.50
Britton & Rey.....	100.00
Boyson's Pharmacy	25.00
Bridge & Beach Mfg. Co.	100.00
Brown Bros. & Co.....	50.00
Bovee, Toy & Co.....	100.00
Baldwin & Howell.....	100.00
Boardman Bros. & Co...	50.00
Browne & Co., R. S.....	25.00
Boulin, P.	5.00
Baldwin Co., The.....	50.00
Bauer, Simon	5.00
Bliss & Faville.....	25.00
Blaskower, M.	150.00
Bachman & Co., S.....	150.00
Beck & Donnelly.....	15.00
Bollman Co., John.....	500.00
Bollman Co., John (Employees)	25.50
Bates, Fred C.....	10.00
Bier, Hip	15.00
Besozzi, Chas.	5.00
Birdsell, J. B.	20.00
Boltz, Clymer & Co.....	25.00
Borgfeldt & Co., George.	100.00
Bridge & Co., H. S.....	25.00
Booth & Sons, L.....	50.00
Bernstein, Fred E.....	20.00
Baron, M. W.....	20.00
Bufford, Chas. S.....	2.50
Bloom & Sons Co., Samuel	75.00
Brown & Adams.....	50.00
Baltz Bros. & Finkleday.	25.00
Bay View Hide & Tanning Co.	25.00
Bates, George E.....	10.00
Brandensteiu, H. U.....	10.00
Browne, A. A.....	25.00
Barthold, Paulson Co....	10.00
Bank of California.....	2,000.00
Bank of British N. A...	300.00
Bank of Italy.....	50.00
Burnham Plumbing Co..	10.00
Bisceglia Bros. Canning Co.	25.00
Broemmel, B.	10.00
Burfiu, J. G.....	2.00

NAME	SUBSCRIPTION
Bayley Drug Co.	2.50
Bortfeld, Henry	15.00
Berger's	10.00
Buckingham & Hecht	100.00
Burrows, Henry	20.00
Bachrach & Co.	5.00
Box Factories (Employees)	100.00
Brunswick, Balke, Collender Co.	25.00
Barth, Rud	5.00
Baker & Hamilton	250.00
Brittain & Co.	25.00
Brownlee Hardware & S. Co.	5.00
Brown & Sons, Chas.	25.00
Bennett Bros.	25.00
Bass-Hueter Paint Co.	100.00
Bonestell, Richardson & Co.	50.00
Bich, W. F. & N. Mangan	10.00
Clearing House	200.00
California Baking Co.	100.00
Cross, S. T.	25.00
Cassalli, V.	1.00
Craviotto, A. & Co.	5.00
Casselli, G.	2.00
Crown Distilleries Co.	150.00
Claus & Heidewald	20.00
Campi's Restaurant (Cucinin Co.)	15.00
Cerf & Co., B.	10.00
Cohn Bros.	5.00
Carlson Currier Co.	100.00
Clayburgh & Co., L. J.	100.00
Crowley, J. B.	50.00
Crocker & Bro., A.	25.00
Cal. Poultry Co.	25.00
Cal. Jewelry Co.	200.00
Cohn, H.	10.00
Collins, E. F.	10.00
Castagnetto & Matteucci	10.00
Coffin, Redington Co.	150.00
Clarion Co., The	50.00
Coleman Alex	25.00
Clayburgh & George	50.00
California Glue Works	100.00
California Shipping Co.	10.00
Chy Lung & Co.	30.00
California Optical Co.	100.00
California Tallow Works	100.00
Conroy, W. J.	5.00
Clinch & Co., C. G.	50.00
California Hydraulic Eng. & Supply Co.	50.00
Cooper Advertising Agency	10.00
Cluff Co., Wm.	200.00
Chapman, Wilfred B.	10.00
Cunningham, Curtiss & Welch	100.00
City of Paris Dry Goods Co.	300.00
Crane Company	600.00
Crane Co.'s Employees	106.25
Carlisle Co., A.	50.00
Cranston Belvel & Dwyer	25.00
City of Paris Dry Cleaning Co.	5.00
Cal. Ink Co.	100.00
City St. Improvement Co.	250.00
Cowen-Heineberg Co.	25.00
Clark & Sons, N.	100.00
Carrigan, Clarence	25.00
Castle Bros.	50.00
Conradi & Goldberg	75.00
Cabanas Cigar Co.	10.00
Carter, Dan P.	10.00

NAME	SUBSCRIPTION
Chicago Cigar Store....	5.00
Comstock Cigar Co.....	5.00
California Wine Assn...	500.00
Consolidated Cal. Vineyard Co.	25.00
Ciocca & Lombardi.....	15.00
Carl Cooperage Co.....	10.00
Cafe Odeon	10.00
Cailleau, Armand, Inc..	100.00
Cosgrave Cloak & Suit Co.	100.00
Curtis & Koenig.....	20.00
Clark, L. Curran.....	5.00
Cook, A. J. & J. R., Inc..	25.00
Crocker National Bank..	2,000.00
Central Trust Co. of Cal.	250.00
City & County Bank....	150.00
Canadian Bank of Commerce	400.00
Cleary, Frank C.....	10.00
Central Cal. Canneries...	200.00
Cal. Fig Syrup Co.....	50.00
Caprili, Lorenzo	2.00
Crown Columbia P. & P. Co.	50.00
Colman's Hat Store.....	25.00
Carroll, Paul T.....	25.00
Collins, Chas. J.....	15.00
Cahn, Nickelsburg & Co.	50.00
Crescent Watch Case Co.	25.00
Compressed Air Machy. Co.	150.00
Caswell, Geo. W. Co.....	100.00
Carneoali, Chas.	5.00
Cal. Watch Case Co.....	5.00
Cribben & Sexton.....	50.00
Cal. Barrel Co.....	50.00
Charlton & Co., E. P....	15.00
Columbus Savings & Loan Society	51.00
Cohn, Max	5.00
Daly & Davitt.....	20.00
Dini, R.	5.00
Duval, Michael	5.00
Davis, W. R.....	15.00
Danziger, L.	2.50
Dinkelspiel & Co., L....	250.00
Deremer & Co.....	5.00
Dinkelspiel, J. S.....	25.00
Durkee, Frank	1.00
De Ferrari & Peters....	5.00
Danforth Whse. Co.....	25.00
Dipple, J.	25.00
Dempster & Son.....	20.00
Dempster Estate Co.....	20.00
Du Pont de Nemours Powder Co.	100.00
Deckelmann Bros.	10.00
Downing & Co., O. P....	25.00
Dunham, Carrigan, Hayden Co.	1,000.00
Deere Implement Co....	100.00
Drew, C. B.....	15.00
Demers & Dagneau.....	10.00
De Long, F. L.....	15.00
Dewey Publ. Co.....	50.00
Dibble, Frank G.....	5.00
De Bare, J. M.....	5.00
Dawson, Fred J.....	15.00
Drossner, A.	5.00
Dahlman, J. H.....	15.00
Donahue, Robt. C.....	10.00
Dunck, Henry L.....	5.00
Davis Schonwasser & Co.	50.00
Davidson, D. M.....	25.00
Donohoe Kelly Banking Co.	300.00
De Lano Bros.....	20.00
Davis Bros.	2.50

NAME	SUBSCRIPTION
Davis Pharmacy	2.00
Dorn, Winfield	5.00
Dillon, Thos.	10.00
Degan Belting Co., L. S.	25.00
Derby, Dr. A. T.	10.00
Dunne, Peter F.	5.00
Dietzgen, Eugene	25.00
Dean Hardware Co., S. J.	15.00
Donnelly, W. J.	5.00
Eppler, Jacob	25.00
Essman, E.	5.00
Erickson, N. A.	5.00
Escher & Co., Lee	25.00
Eichorn & Bro., J. A.	25.00
Eisenberg & Co., A.	75.00
Emporium, The	1,000.00
Eccles & Smith Co.	50.00
Examiner, S. F.	500.00
Edlin, J.	10.00
Elder & Co., Paul	30.00
Emerson Drug Co.	25.00
Eagle Mills	25.00
Ehrman Bros. & Co.	150.00
Elman, E. M.	50.00
Enterprise Foundry Co.	10.00
Evans & Co., Inc., C. H.	10.00
Eby Machinery Co.	50.00
Eagle Tannery	50.00
Evans, Evan C.	10.00
Eilers Music Co.	100.00
Eagle Pharmacy	5.00
Egan & Co., E. J.	15.00
El Drisco Hotel	50.00
Everett Pulp & Paper Co.	50.00
Fritch, J. Homer	40.00
Foster Co., Geo. H.	5.00
Franchi, V.	5.00
Frediani, R.	5.00
Farello, A.	2.00
Frohman & Priester, Inc.	25.00
Fisher & Co., George	10.00
Franklin, Henry L.	10.00
Flatow & Co., I.	10.00
Fleischman & Cleve.	25.00
Fisher, Chas.	10.00
Friedlander & Son, E.	50.00
Fownes Glove Co.	25.00
Flamm, G.	10.00
Freer, Burr W.	25.00
Forbes, H. A.	5.00
Fulton, Wm.	10.00
Fing Fow of Wing Tuck	10.00
Fuller, Chas. F.	10.00
Ferry Drug Co.	25.00
Firmin, John L. E.	25.00
French & Linforth	10.00
Fairbanks, Morse & Co.	25.00
First National Bank	1,250.00
First National Bank's Employees	111.00
Foster & Co., S.	50.00
Fairmont Barber Shop	2.50
Fairmont Barber Shop's Employees	1.50
Folger & Co., J. A.	500.00
Froelich, Christian	100.00
Ferguson-Breuner Co.	10.00
Frankel, Gerdts & Co.	100.00
Foster & Orear	25.00
Foss & Bros., A. S.	5.00
Fleischmanu Co., The	50.00
Finke's Widow, A.	20.00
Frapolli & Co., B.	10.00
Frank & Co., S. H.	100.00
Fostoria Glass Co.	25.00
Firebaugh, C. S.	10.00
Flickinger Co., J. H.	50.00
Fries & Co., Jos.	5.00

NAME	SUBSCRIPTION
Fletcher, Dr. Thos	5.00
Fauda, C. O	5.00
Floriston, P. & P. Co	50.00
French Laundry Co	5.00
Fannin & Elmendorf Co.	40.00
Frank, A. L	10.00
Friedman & Cohnreich Co	15.00
Fischbeck Soap Co	10.00
Fairmont Hotel	500.00
Fineberg, Louis	5.00
French Savings Bank	80.50
Frick Wills Hardware Co	15.00
Forsyth, Robert	5.00
Fuller & Co., W. P	250.00
Frank & Mansfield	5.00
Fleishhacker & Co., A	100.00
Freudenthal, Felix	10.00
Florists of San Francisco	53.00
Golden Eagle Mllg. Co	25.00
Gladding, McBean & Co.	100.00
Griffi, G.	5.00
Garibaldi, O.	5.00
Galli & Galli	5.00
Galli & Sylvester	5.00
Galli & Co	5.00
Galli Bros.	5.00
German Savings & Loan Soc'y	853.00
Got & Co., Wm	10.00
Goldman, I.	25.00
Gerson & Breyer	25.00
Graf & Co., J. L	50.00
Girvin & Eyre	100.00
Gottheim & Co., L	10.00
Growall & Co., W. L	25.00
Grundel, Otto F	2.50
Glidden, W. S	50.00
Greenzweig & Co., George	25.00
Glindemann, Wm.	20.00
Gardiner Bros., Inc	10.00
Gilley, Schmidt Co	20.00
Gadner, A.	10.00
Globe Grain & Mllg. Co.	50.00
Gilhuly & Ambler	10.00
General Electric Co	200.00
Grace & Co., W. R	250.00
Greenebaum, Weil & Michels (Employees)	20.00
Ghirardelli & Co., G	100.00
Goldmeyer Bros.	5.00
Gally, James	2.75
Gibbs, J.	5.00
Gump, S. & G	50.00
Gosse, Wm.	10.00
Great American Imptg. Tea Co.	50.00
Gunst & Co., M. A	500.00
Gamble, J. M	100.00
Goslinsky, E.	75.00
Gleason, G. R	5.00
Golden Pheasant Restaurant	20.00
Golden Gate Cloak & Suit House	100.00
Gebhardt & Co., C	50.00
Gould, Sullivan & Co	50.00
Goldman & Kramer	10.00
Gorrill, William H	5.00
Garibaldi & Oliva	2.50
Girard & McCormick Drug Co.	5.00
Green, F. T	10.00
Galland Mercantile Laundry	50.00
Graham, R. E.	10.00

NAME	SUBSCRIPTION
Gallivan, John H.....	5.00
George Shoe Co.....	10.00
Gorham Rubber Co.....	20.00
Goodyear Rubber Co....	25.00
Garin, Paul H.....	1.00
Gruenhagen Bros.	10.00
Gregory Hardware Co...	25.00
Golcher Bros.	5.00
Graham Paper Co.....	25.00
Gibson, Miss (millinery)	5.00
Hansen & Co., P. C.....	5.00
Hoelsken, Valentine	5.00
Hume Co., G. W.....	25.00
Horst Co., E. Clemens...	200.00
Harriman, F. W.....	10.00
Heller, Klein & Co.....	250.00
Hinz & Landt Co.....	100.00
Hart & Co., B.....	100.00
Holm & Nathan.....	100.00
Hamburger & Co., D....	100.00
Hall & Son, G. C.....	25.00
Hirsch & Lauter Co.....	5.00
Heller, E. & S.....	100.00
Hirsch & Stoff.....	5.00
Hirsch & Kaiser.....	50.00
Hall & Son, A. I., Inc...	100.00
Hackett, H. C.....	4.00
Hansen, N. L.....	4.00
Harrison & Co., M. C...	5.00
Haslett Whse. Co.....	50.00
Hoffman, Rothschild & Co.	500.00
Hoskins, B.	25.00
Hansen & Hillebrand...	25.00
Howes & Co., H. A.....	25.00
Hind, Rolph & Co.....	100.00
Horn, Wm. P.....	10.00
Howard, M.	10.00
Hord, W. H.....	10.00
Hendy Iron Works, Joshua	100.00
Henshaw, Bulkley & Co.	100.00
Harron, Rickard & McCone	250.00
Harron, Rickard & McCone (Employees) ...	17.00
Hamberger, Polhemus Co.	20.00
Haas & Sons, Geo.....	75.00
Haas Bros.	200.00
Hooper & Jennings.....	100.00
Holcombe & Co., R. A...	15.00
Hunt, Mirk & Co., Inc..	50.00
Hastings Trust Estate..	50.00
Holbrook, Merrill & Stetson	250.00
Heyman-Weil Co., The..	50.00
Haines, Jones & Cadbury Co.	200.00
Heller, E. S.....	25.00
Hale Bros., Inc.....	1,000.00
Hastings Clothing Co...	100.00
Heller & Co., E. C.....	10.00
Helbing Hat Co.....	100.00
Helbing Hat Co. (Employees)	26.50
Hooker & Lent.....	100.00
Harrigan, Weidenmuller & Rosenstirn	100.00
Heyman & Bro., Oscar..	50.00
Hearst, Mrs. Phoebe A..	100.00
Himmelstern Bros.	25.00
Hollub, Gabriel Co.....	10.00
Hicks-Judd Co.	50.00
Hoffman & Robinson....	15.00
Horn & Co.....	100.00
Hower & Co., Cerro.....	10.00
Hoelscher & Co., Wm....	25.00

NAME	SUBSCRIPTION
Hewitt Machinery Co., The	25.00
Hadjustas, J.	5.00
Haub Bros.	25.00
Hanak & Co., I.	20.00
Harris & Co., I.	25.00
Harpham & Jansen	20.00
Hongkong & Shanghai Bkg. Corp.	50.00
Hertzstein, Dr. M.	50.00
Herbert & Cordes	5.00
Hunt Bros. Co.	200.00
Hargrave & Ritchie	5.00
Hecht Investment Co.	100.00
Hobro, W. D.	10.00
Hatch, Dr. J. H.	5.00
Harmon, H.	2.50
Herrman & Co	10.00
Hansen & Elrick	10.00
Herman, Louis	5.00
Harney & Gallagher	5.00
Howard Watch Co., E.	25.00
Home Telephone Co.	1,000.00
Hayes Park Laundry	10.00
Heim, F. L.	2.50
Hall, George	5.00
Heinze, Fred J.	2.50
Hackfeld & Co., H.	25.00
Hesthal, W. J.	10.00
Hartman, E. W.	5.00
Heinz, C.	5.00
Haas, Edward F.	5.00
Humboldt Savings Bank	131.25
Hawaiian Fert. Co.	50.00
Hibernia Savings & Loan Society	1,255.75
Hart, John P.	2.50
Ickelheimer Bros.	100.00
Insurance Brokers' Exchange	500.00
Iwakami & Co. (Employees)	7.00
Illinois Pacific Glass Co.	100.00
Italian-Swiss Colony	100.00
Imperial Gas Engine Co.	10.00
International Banking Corp.	250.00
Italian-American Bank.	250.00
Insurance Office Employees:	
Board of Fire Underwriters	119.00
New York Underwriters' Agency	25.00
Macdonald & Miles	27.00
Queen City Fire Ins. Co.	11.00
London & Lancashire Fire Ins. Co.	25.00
Connecticut Fire Ins. Co.	57.50
Rolla V. Watt Agency	45.50
Pennsylvania Ins. Co.	10.00
Norwich Union Fire Ins. Office	12.50
Firemen's Fund Ins. Co.	163.00
Gordon & Hoadley	26.50
Christensen & Goodwin	30.50
Liverpool & London & Globe Ins. Co.	139.00
Aetna Ins. Co.	39.00
Hartford Ins. Co.	50.00
C. A. Henry & Co.	54.50
McNear & Wayman	41.50
Geo. H. Tyson	37.50
Franklin Insurance Co.	20.00
Walla Walla Insurance Co.	5.00

NAME	SUBSCRIPTION
Insurance Co. of North America	20.00
Ohio German Insurance Co.	25.00
Dickson & Thieme	26.00
Commercial Union Assurance Co., Ltd.	23.50
Irving, Ben	10.00
Ils & Co., John G.	10.00
Joe Company, S.	5.00
Jacob & Co., Andrew A.	50.00
Jacobs & Bro., F. P.	50.00
Judis Co., Alphonse	100.00
Jacobs & Sons	5.00
Johnson J. G.	100.00
James Co., J. G., Inc.	50.00
Jordan, Arthur H., Inc.	5.00
Judson Mfg. Co.	100.00
Jennings Co., The C. B.	25.00
Jones & Co., S. L.	25.00
Johnson-Locke Mercantile Co.	50.00
Jacobi & Co., J. M.	15.00
Johnson & Johnson	50.00
Johnson, G.	5.00
Jacobson, Ralph	5.00
Jenkins Machine Works.	10.00
Japanese Association of America (includes all Japanese merchants, banks, etc.)	1,619.50
Jaegeling, Dr. J. P.	10.00
Johansen Bros. Shoe Co.	20.00
Jordan Co., Geo. B.	10.00
Jungblut Co., A.	25.00
Joost Bros.	25.00
Jones, Edward	15.00
Jackson, H. L.	10.00
Jones-Paddock Co.	100.00
Judell & Co., H. L.	75.00
Jerichau, J. L.	10.00
Komsthoeft, Albert	50.00
Kraft, John	20.00
Kardassakis, D.	3.00
Koshland, A.	5.00
Kelly Co., J.	10.00
Kisen Co., The	5.00
Kohlberg & Co., M. S.	50.00
Kraker, M.	10.00
Kuh Bros.	20.00
Katz, L.	2.50
Klimm, Frank J.	25.00
Kramer & Co., S.	10.00
Koshland & Co., S.	50.00
Knighten, Robert	10.00
Kiethley Co., E. A.	10.00
Kinney Co., R. W.	300.00
Kohlberg-Cassina Co.	15.00
Kohler & Chase	75.00
Klein, A. E.	10.00
Knights of the Royal Arch	500.00
Knapp & Co., W.	25.00
Knubel, Chas. H.	20.00
Kohlberg & Co.	75.00
Kasser Bros.	15.00
Krumb & Mierson	20.00
Kountourie & Thanos	2.50
Koenig & Collins	100.00
Kramer, A. H.	2.50
Karnes, W.	5.00
Krieg Tanning Co.	50.00
Kaufman, Davidson, Semmel, Inc.	50.00
Keyes, Alexander D.	25.00
Korbel Box Factory	25.00
Keilus & Co., Chas.	50.00
Koch, E.	5.00

NAME	SUBSCRIPTION
Kiernan & O'Brien	25.00
Kearney, D. W.	5.00
Kass, D. S.	2.00
Kline & Co., Louis.....	100.00
Kuh Shoe Co., G. M....	20.00
Keystone Watch Case Co.	25.00
Kron Tanning Co.	50.00
Knaacke Shoe Store....	2.50
Klatt-Hirsch Co.	25.00
Louvre, The	50.00
Lorenzini, L.	5.00
Lorenzini Fruit Co. ...	5.00
Landy & Co., F., ...	5.00
Langendorf, B.	20.00
Larsen, Carl G.	100.00
Lippman Bros.	25.00
Lodge, E. A.	5.00
Livingston Bros.	250.00
Lowenstein, David	20.00
Loewy & Co., E.	50.00
Levy Bros., Inc., Jules..	250.00
Luscombe & Isaacs	50.00
Ling Tuck Fung Fu....	40.00
Linen Thread Co.	100.00
Lehrberger & Co., J. S..	25.00
Levy, Emanuel	5.00
Lascalle, Ward	4.00
Lundy, Thomas	25.00
Lichtenstein Co.	20.00
Lezinsky, Fred L.	10.00
Langley & Michaels Co.	150.00
Langley & Michaels Co.'s employees	47.00
Lengfeld's Pharmacy's employees	20.00
Leist & Co., Chas. J.....	10.00
Lilienfeld & Co., Alfred.	100.00
Levy, Henry	250.00
Lahaney & Co.	25.00
Levy, Isaac	100.00
Lastreto & Co.	25.00
Lick Baths, James, employees	5.50
Lewin, Leon	25.00
Landsberger, A. H.	25.00
Lorenzini & Belli	2.50
Livingston, L.	25.00
Lake Tahoe Ry. & Trans. Co.	50.00
Law, Hartland	100.00
Lally Co.	100.00
Library Bureau	25.00
Lyon & Sons, Henry....	20.00
Lyon & Hoag	100.00
Lang, Stroh Co.	25.00
Lovell Field Co.	25.00
Libby, McNeil & Libby.	100.00
Levenson Co.	20.00
Lisberger, D. S.	50.00
Lachman & Jacobi	100.00
Lyons & Raas Co., E. G.	50.00
Lancel Co., E. H.	10.00
Livingston Mfg. Co.....	5.00
Los Angeles Soap Co...	10.00
Luhn, Otto	10.00
Loaiza & Co., W.....	25.00
Legallet, Hellwig Tanning Co.	100.00
Lawrence & Parkhurst..	25.00
Lawyers' Title Co.	10.00
London, Paris & American Bank	1,000.00
Looney, J.	25.00
Lubliner & Co., C. W....	10.00
La Grande Laundry	25.00
Lundstrom Hat Works..	25.00
Lucy & Co., G. R.....	10.00
Leipnitz, G.	5.00

NAME	SUBSCRIPTION
Lee, R. A.	5.00
Lewis, Mrs. A.	3.00
Levy, Max	20.00
Merchants Exchange	200.00
Merchants' Association	200.00
Maldonado & Co	100.00
Morgan & Downey	15.00
Mammini & Co.	5.00
Maiorino, F. A.	5.00
Milanesi	1.50
Manufacturers & Produce Assn.	100.00
Meyer, Daniel	100.00
Miller & Co., W. A	50.00
Manheim, Dibbern & Co.	10.00
Mautz & Co., A.	25.00
Machol & Lowenstein	10.00
Marks Bros.	10.00
Muller & Raas Co	100.00
Moore Watson Dry Goods Co.	250.00
Murphy Grant & Co	500.00
Mendelson Bros., Inc.	50.00
Miller & Co., A. C	10.00
Meyer, Wilson & Co	250.00
Moore, Ferguson & Co	25.00
Mendelson, I., Australian Woolen Mills	5.00
Mohr & Sons, R	10.00
Mathews Co., Roy P	25.00
Mayer & Weinschenk	25.00
Mitchkus, J. J.	2.50
Myers, R. & L	5.00
Macarthur, Walter	10.00
Moffat Co., Inc., H	175.00
Miller & Lux, Inc	1,000.00
Martin, Mrs. Eleanor	100.00
Moseley-Bresse Co.	10.00
Myers & Co., L. A	25.00
Myers & Co.'s, L. A., employees	6.00
Maharg, W. J.	5.00
Marriott, F.	50.00
Moore & Co., Chas. C	250.00
Moore & Co.'s, Chas. C. employees	145.00
Mission Bank	100.00
Maillard & Schmiedell	50.00
Mailliard & Schmiedell's employees	9.00
Mauzy, Byron	20.00
Merchants Exchange Barber Shop	5.50
Mamlor, M.	5.00
Mangrum & Otter, Inc	100.00
Mackey & McMahon	5.00
Miller & Baumgart	10.00
Madden, Edward	10.00
Madison & Burke	100.00
Magee & Sons, Thos	100.00
Marsh Co., Geo. T	25.00
Mihran, M. B.	10.00
Marsh & Kidd Co	5.00
Molera, E. J.	25.00
Matheas, Chas. Co.	20.00
Michalitschke Bros. Co., Inc.	10.00
Master Painters & Decorators' Assn.	50.00
Martenstein & Co., J	10.00
Moore & Scott Iron Works	10.00
Murray Bros.' Machine Works	10.00
Magnin & Co., J.	100.00
Marks, Mrs. H.	25.00
Metten & Gebhardt	30.00
Morrison, Cope & Brobeck	25.00

NAME	SUBSCRIPTION
Mercantile Trust Co. ...	1,000.00
Merchants' National Bk..	100.00
Mazza, John J.....	1.00
Moore Mill & Lumber Co.'s employees	20.00
Meussdorfer & Sons, J. C.	25.00
Mauzy & Reid Shoe Co..	25.00
Mandell, Wiener & Co...	50.00
Maples, Ed. T.....	15.00
Moore & Sheehan	25.00
Miller, Dr. O. L.....	5.00
Milk Dealers' Assn.	713.00
Mission Savings Bank...	25.00
Mutual Savings Bank...	200.00
Mechanics Savings Bk..	13.00
Macbeth Evans Glass Co.	50.00
Magner Bros.	75.00
Moeller, W.	5.00
Morse, P. J.	2.50
Mills & Hagbom.....	25.00
McNear, Geo. P.....	25.00
McLeod Mercantile Co...	10.00
McMullin & Eyre.....	10.00
McNutt Kahn & Co.....	50.00
McNear, G. W.....	250.00
McGerry & Co., Inc., W. B.	10.00
McCarthy, C. T.	10.00
McGiffin, Joseph	5.00
McCreery, Richard S. ...	100.00
McNamara, M.	2.50
New Popular Restaurant	25.00
Newbauer Bros.	35.00
Nonotuck Silk Co.....	75.00
Northern Commercial Co.	500.00
Nordman Bros. Co.....	100.00
New San Francisco Loan Office	1.00
Newmark, A.	25.00
Newman & Levinson ...	500.00
Nathan Dohrmann & Co.	250.00
New Frank's Restaurant	10.00
New Frank's Restaurant employees	5.00
National Cash Register Co.	25.00
Newell & Bro.	10.00
Norton Tanning Co.	100.00
New Method Laundry...	100.00
Nolan Earl Shoe Co.....	50.00
New California Jockey Club	1,000.00
Nason & Co., R. N.....	75.00
Orpheum Circuit Co.....	200.00
Old Homestead Bakery..	100.00
O'Brien & Spotorno.....	25.00
Otis, McAllister & Co....	50.00
O'Connor, Moffat & Co...	750.00
Oppenheimer & Asher...	2.50
Osgood & Howell	10.00
Owl Drug Co.	25.00
Oceanic S. S. Co.....	100.00
O'Callaghan, Dan	50.00
Occidental Supply Co....	25.00
Olsen, Peter	15.00
Olney, Jr., Warren.....	20.00
Ottenheimer Bros.	10.00
O'Mara, J. E.	5.00
O'Rourke Eubanks Hat Co.	25.00
O'Brien, J. D.	2.50
O'Neill & Eber	5.00
Olympic Arms Co.....	10.00
Osborne Hdw. & Tool Co.	25.00
Peirot, D.	100.00
Permanent Downtown Assn.	1,000.00
Pienraccini, A.	5.00

NAME	SUBSCRIPTION
Pienraccini, G.	5.00
Pisani & Co., A.	5.00
Pugliesa, G.	2.50
Petroni, G.	2.00
Palisso & Co., V.	2.50
Palmini, V.	5.00
Page, McCutchen & Knight	150.00
Pope & Talbot	20.00
Pacific Syndicate Co.	10.00
Planz, Theo.	10.00
Pacific Goldsmiths	5.00
Phillips & Co., M.	20.00
Pauson & Lowenstein	50.00
Peterson, S.	25.00
Pierce Rodolph Storage Co.	25.00
Patek & Co., F.	50.00
Peabody & Co., Henry W.	100.00
Pike Co., C. W.	7.00
Pringle-Knight Co.	5.00
Pierson, Roeding & Co.	10.00
Police Court No. 4 attaches	10.00
Page Bros.	5.00
Pacific Tel. & Tel. Co.	2,500.00
Pacific Guano & Fert. Co.	50.00
Peterson & Co., Frank B.	100.00
Pascal, Dubedat & Co.	20.00
Parrott & Co.	50.00
Phœnix Packing Co.	20.00
Pacific Distributing Co.	5.00
Phelan, James D.	250.00
Pacific Barbers' Supply & Cutlery Co.	2.50
Palace Barber Shop	2.50
Prager Company, Inc.	250.00
Payot, Stratford & Kerr	30.00
Pacific Implement Co.	100.00
Pacific Hardware & Steel Co.	1,500.00
Petaluma & Santa Rosa Ry. Co.	250.00
Page, John W.	5.00
Phillips & Van Orden Co.	75.00
Pacific States Type Foundry	50.00
Petzold, August	2.50
Pilot Printing Co.	10.00
Phœnix Iron Works	5.00
Pacific Foundry Co.	25.00
Pacific Rolling Mill Co.	20.00
Pelton Water Wheel Co.	50.00
Popovich, V. P.	3.00
Progheki & Lecheos	5.00
Paragon, The	30.00
Poetsch & Peterson	75.00
Pillsbury, E. S.	50.00
Patton, Joseph W.	2.00
Pratt-Low Preserving Co.	50.00
Pyle & Son, Inc., J. F.	50.00
Platt, Frank L.	10.00
Pacific Label Co.	5.00
Pioneer Soap Co.	10.00
Peterson, Axel H.	10.00
Post, C. E.	2.50
Philadelphia Watch Case Co.	25.00
Plume & Atwood Mfg. Co.	50.00
Pike & Co., A. W.	10.00
Palace Hardware Co.	25.00
Philpott, C. H.	5.00
Pacific Tool & Supply Co.	100.00
Paraffine Paint Co.	50.00
Pacific Oil & Lead Wks.	125.00
Pearce, H. C. (employee S. P. Co.)	2.00

NAME	SUBSCRIPTION
Pacific Coast Paper Co..	39.50
Pippy, Geo. H., Col.....	11.00
Raffo, G. B.	5.00
Romani, B.	5.00
Robinson, W. W.....	20.00
Reiss & Son, B.....	100.00
Robinson Bros.	50.00
Rosenthal, Maurice	50.00
Rothschild & Co., A.....	50.00
Remington, E.	10.00
Rosenfeld's Sons, John..	100.00
Radke & Co.	100.00
Roos Bros.	300.00
Roos Bros. employees....	32.50
Raphael's	100.00
Roth, Blum & Co.....	100.00
Royal Worcester Corset Co.	50.00
Rust, Clement P.....	5.00
Rix Compressed Air & Drill Co.	50.00
Roberts & Bros. Geo.....	7.50
Ray Mfg. Co., W. S.....	5.00
Reed Co., Geo. Russell..	25.00
Rapp & Son, John.....	100.00
Roeblings Sons Co., John A.	250.00
Rabjohn & Morcom.....	5.00
Rothermel, P.	5.00
Rothermel, P., & Co.....	5.00
Robertson, A. M.	10.00
Rubenstein, I. E.	5.00
Rinaldo, H.	5.00
Rosenblatt Co., The	100.00
Risdon Iron & Locomotive Works	100.00
Ransohoff, L.	100.00
Ratner, H.	10.00
Royal Soap Co.	3.00
Rixford, E. H.	10.00

NAME	SUBSCRIPTION
Recorder Printing & Publishing Co.	20.00
Ruffino & Bianchi	20.00
Rockstroh, F. E.....	15.00
Root, Geo. A.	5.00
Railroad Pharmacy	2.50
Raymond Granite Co....	50.00
Ransom, T. W.....	5.00
Swayne & Hoyt.....	50.00
Sperry Flour Co.	100.00
Stoer Warehouse Co. ...	20.00
Swain Co.	20.00
Simi & Son, V.....	5.00
Selmi, Wm.	5.00
Scafidi, A.	5.00
Solari, L.	5.00
Spynes, Henry	1.00
Strauss & Co.	50.00
Soule, W. F.	5.00
Somers & Co.	200.00
Sandy & Bestandig.....	15.00
Schoenholz & Elsbach...	20.00
Schwartz & Goodman...	20.00
Shoong & Co., Joe.....	10.00
Scaright, Waldeck & Co..	20.00
Schmidt & Co., Benj. J..	100.00
Strauss & Co., Levi.....	750.00
Strauss & Co.'s, Levi, employees	50.00
Simons, L. S.	50.00
Steinberger & Kalisher.	100.00
Semeria & Co., Henry...	25.00
Scott & Magner.....	150.00
Scott & Magner's employees	30.00
Steil, Henry	25.00
Sinsheimer Bros.	20.00
San Francisco Savings Union	655.75

NAME	SUBSCRIPTION
Schaetzlein & Son, R.	10.00
Shreve & Co.	300.00
Sheppler & Son, W.	5.00
Schussler & Co., M.	300.00
Sorenson Co.	50.00
Silviera, Mrs.	1.00
Scott, Chas. F.	15.00
Sellman & Co.	25.00
Serwe & Prien Co.	25.00
Sweeney & Lombard	25.00
S. F. Draymen's Assn.	500.00
Stumpf Co., John	100.00
South [illegible] F. Packing & Prov. Co.	200.00
Salles & Chicorp	25.00
Stockton Milling Co.	50.00
Schweitzer & Co., J.	50.00
Spool Cotton Co., The	100.00
Schilling & Co., A.	500.00
Schilling & Co.'s, A., employees	61.50
Southern Pacific Co.	29,250.00
Southern Pacific Co.—	
Employees of H. J. Small	29.00
Acct. Dept. employees.	124.40
Traffic Mgr. employees	40.00
Master Car Repairer employees	9.50
Store Dept. Coast Div. employees	6.00
Strohmeier Bros.	10.00
Sussman, Wormser & Co.	200.00
Sherwood & Sherwood	50.00
Sherman, Clay & Co.	200.00
Standard Oil Co.	5,000.00
Security Investment Co.	10.00
Selby Smelting & Lead Works	375.00
Schmidt Litho Co.	200.00
Summerfield & Haines	10.00
Schoenfeld Clothing Co.	10.00
Stuhr, Chas. G.	25.00
Snook & Son, W. S.	100.00
Shainwald Buckbee & Co.	100.00
San Francisco Development Co.	50.00
Speck, Paschel & Co.	25.00
S. F. Planing Mill Owners' Assn.	760.00
Seybold Machine Co.	25.00
Stone, Jr., & Co., B. F.	10.00
Spohn Co., John H.	15.00
Stone & Bay Co.	5.00
Schussler Bros.	50.00
South End Warehouse Co.	50.00
Sugarie, The	20.00
Sanborn Vail & Co.	100.00
Sanborn Vail & Co.'s employees	55.50
Swiss-American Bank	50.00
Schloss Crockery Co.	20.00
Schmidt & Christensen	15.00
Stern & Austin	5.00
Schoenfeld, D. M.	75.00
Shine, W. A.	5.00
Samish, L. R.	2.50
Salberg Bros. Co.	5.00
Sievers Floral Co.	5.00
Schilling & Co., C.	50.00
Schlesinger & Bender	50.00
Swiss-American Wine Co.	10.00
Scoville Iron Works	5.00
Stieger & Kerr Stove & Foundry Co.	25.00
Schilling & Sons, Adam	10.00
Sanitary Devices Mfg. Co.	10.00

NAME	SUBSCRIPTION
San Francisco Milling Co.	25.00
Stamer, M. H.	5.00
St. Germain Restaurant.	10.00
Scar, Antone	5.00
Strauss, Sig.	25.00
Sentinel Cloak & Suit House	25.00
Shirek, Carl	10.00
Savings & Loan Society.	138.50
Sunset Tanning Co.	30.00
Marvin Showler Hide Co.	10.00
Sutro, Alfred	10.00
Sutro, Oscar	5.00
Stevens, J. A.	2.50
Sternheim & Son, S.	50.00
Sumner & Co., W. B.	10.00
Smith, Sidney V.	20.00
San Francisco National Bank	500.00
Seaboard Bank	50.00
Sargent, Geo. C.	10.00
San Francisco Labor Council	25.00
Shurtleff, Chas. A.	10.00
Sheldon, L. C.	50.00
Stulsaft Co., M.	5.00
Sunset Pharmacy	2.50
Samter & Sons' employees	4.25
San Francisco Gas & Electric Co.	2,500.00
San Francisco Laundry Assn.	100.00
Sanitary Laundry Co.	20.00
Strickland, S. L.	2.50
St. Francis Hotel	500.00
Sommer & Kaufmann	30.00
Scollard Shoe Co.	5.00
St. Louis Shoe Co.	2.50
Shield of Quality Shoe Co.	2.50
Stromaier, C.	5.00
Security Savings Bank	100.25
Scandinavian Savings Bank	10.00
Spiro, S.	5.00
Sherwin-Williams Co.	100.00
Samuels Lace House Co.	250.00
Smith, S. F.	10.00
Trinchero & Co., M.	5.00
Thomas Parisian Dyeing & Cleaning Works.	100.00
Tsue Chong Wing Kung Kee	5.00
The Robert Dollar Co.	50.00
Turner Bros.	25.00
Taaffe & Co., W., Inc.	150.00
Third & Sons	5.00
Tubbs Cordage Co.	250.00
Tyler & Son, S. H.	25.00
Tillman & Bendel	200.00
Tay Co., Geo. H.	300.00
Tully Rubber Stamp Works	5.00
Tracy Engineering Co., The	50.00
Thorne & McMann	25.00
Towle, Geo. W.	5.00
Tobin, J. S.	25.00
Triest & Co.	50.00
Tieburg Bros.	7.50
Tadross & Co.	2.50
Towle, F.	5.00
Urioste & Co.	10.00
Uri & Co., F.	50.00
Union Lithograph Co., The	100.00
Upham Co., Isaac	25.00

NAME	SUBSCRIPTION
Upham Co.'s, Isaac, employees	14.00
Union Feed Co.	25.00
Union Merchants' Ice Delivery Co.	50.00
Umbsen & Co., G. H.	100.00
United Cigar Stores	250.00
Union Iron Works Co.	250.00
United States Glass Co.	50.00
Union Trust Co. of San Francisco	1,000.00
U. S. Consolidated Seeded Raisin Co.	1,500.00
United Workingmen's Boot and Shoe Co.	50.00
Union House	2.00
United Railroads	5,000.00
Volkman & Co., C. M.	20.00
Vanderslice Co., W. K.	50.00
Van Ness, H. C.	5.00
Van Vliet, Louis	20.00
Volmer & Perry	50.00
Vance, R.	20.00
Von Rhein Real Estate Co.	25.00
Vickery, Atkins & Torrey	50.00
Volz & Co., F. B.	25.00
Veganego, E.	5.00
Vitaich, G. J.	5.00
Van Howe, L.	5.00
Van Wyck, M. D., Crittenden	1.00
Van Ness Ave. Retailers' Assn.	600.00
Van Ness Realty Co.	1,100.00
Vaut Hardware Co., E. D.	5.00
Wucherer & Fink	20.00
Waterman, Emil	5.00
Wolf & Co., Philip	50.00
Wightman, Jr., John	5.00
Walley, E. E.	10.00
Weinstock, Lubin & Co.	250.00
Washauer Bros.	50.00
Waterman, Levy	50.00
Western Fancy Goods Co.	50.00
Welch & Co.	250.00
Williams & Berg Co.	50.00
Williams & Berg Co.'s employees	10.00
Western Meat Co	1,000.00
Whitney & Co., J. B.	25.00
Weule Co., Louis	5.00
Webster Warehouse Co.	10.00
Wood Lumber Co., The, E. K.	25.00
Waldron & Dietrich	25.00
Wilson Co., Wm. F.	200.00
Weill & Co., Raphael	1,000.00
Williams & Surryhne	10.00
Woods & Huddart	10.00
Winchester, Fred P.	5.00
Woodin & Little	25.00
Whitney & Co., C. E.	100.00
Worthington Pump Co., H. R.	100.00
Williams-Marvin Co.	50.00
Williams-Marvin Co.'s employees	36.00
Wilson Bros. Co.	10.00
Wiell, Louis	6.00
Wertheimer & Pearlstein	10.00
Watson, Pond & Riddle.	100.00
Willits & Patterson	10.00
Wakelee & Co.	10.00
Wolf & Co., Edw.	25.00
Willard Bros.	15.00
Whittier, F. T.	5.00
Weill, Lewis	5.00

NAME	SUBSCRIPTION
Westinghouse Electric & Mfg. Co.	200.00
Wiester & Co	25.00
Wolfe & Hawley	25.00
Weinstein, M.	20.00
Wright, John A	5.00
Wright & Wright	10.00
Welsbach Co.	50.00
Woerner, Estate of David	25.00
Wise, Otto Irving	10.00
Wells Fargo Nevada National Bank	2,000.00
Western National Bank.	300.00
Wells Fargo & Co.'s Express	2,500.00
Waterman, L. E. Co.	25.00
Ward, P.	5.00
Wetzel & Grass	25.00
Williamson & Co., H.	10.00
Weaver Pharmacy	2.50
Winslow & Co., C. R.	25.00
Wulzen, D. H	2.50
Wagner Leather Co.	25.00
Wolf & Bro., H	7.50
Weirich & Grolund	10.00
Williams Hardware & Stove Co.	15.00
Wright & Hood Hardware Co.	10.00
Walker Stove & Range Co.	10.00
Winchell, V. W	25.00
Whittier, Coburn & Co.	200.00
Willamette Pulp & Paper Co.	100.00
Wolf, H.	2.50
Young, Julius A	10.00
Young Machinery Co., A. L.	50.00
Yawman & Erbe Mfg. Co.	100.00
Youngs Drug Store	5.00
Young Co., Geo. H	15.00
Yates & Co	50.00
Zambelli Bros.	5.00
Zippel & Zadiclovich	5.00
Zabaldano & Co., A	15.00
Zellerbach Paper Co.	100.00
Miscellaneous subscriptions	454.23